Project Organization and Team Roster: Communication and Athletes With Hearing Loss

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The Quarry Lane School

Lemelson-MIT InvenTeams

Mr. Ong, Mrs. Laing, Mrs. Shin

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1) Team Roster:

While the team is composed of engineering students from grades nine through eleven, each member has unique characteristics, talents, and different strengths. A common interest in STEAM is what brought them all together under a single unified team: the Quarry Lane InvenTeam.

Name	Grade	Quick Bio (Sports, Engineering Experience, Hobbies)
Brigitte Chung	11	- QLS Robotics Team - Journalism Club Secretary - 8th Grade: Engineering 8 - 10th Grade: Advanced Engineering Honors - Enjoys creative writing
Brycen Martin	10	- QLS Cross Country, Track and Field; - Swimmer; 4 years Basketball player - 9th Grade: Intro to Engineering - Enjoys coding simple games.
Ziyi Gao (Christine)	11	- QLS Basketball 3 years - 9th Grade: Advanced Engineering Honors - 10th Grade: Design Studio Honors & TA - Experience with Rhino - Enjoys designing and modeling
Corina Chen	9	- QLS Basketball and Competitive AAU 5 years - Robotics & Science Team 7 years - InterAct club Treasurer in 7th grade - School Photographer 6th Grade - Enjoys drafting, writing stories, and casting
Eesha Sanjay	9	- Swimmer, played volleyball, and black brown belt in karate - QLS Robotics Team - 8th Grade: Engineering Design 8 - Enjoys writing and building things

Harini Buddaluru	11	- QLS Robotics Team (FTC & FRC) - QLS Speech & Debate club - 10th Grade: Advanced Engineering Honors - Enjoys writing, reading, programming, and designing
Krithik Duvvuri	9	- QLS Basketball and Soccer Team - Soccer:8 years, SRFC; Swimmer:3 yrs; Tennis:2yrs - QLS Robotics Team(FTC) - 8th Grade: Advanced Engineering 8 - Enjoys creating w/ design process, and coding
Varshini Vijay	10	- QLS Basketball 1 year - 9th grade: Intro to Engineering - Enjoys marketing and finance
Zhilu Xie (Rachel)	11	- QLS Basketball 3 years - MUN participant 3 years - 9th Grade: Advanced Engineering Honors - 10th Grade: Design Studio Honors & TA - Experience with Rhino, Fusion 360, and Solidworks - Enjoys building, modeling, and designing

2) Team Organization

The team is divided into three sub teams: research, outreach, and design. Additionally, every member is responsible for contributing and coordinating between the groups. In the research sub team, the goal is to better understand the problem through articles, interviews, and existing products. Those in the outreach team contact and form connections with organizations, schools, and associations associated with the deaf athletics community. The design team explores various possibilities of the solutions, documenting the ideas with numerous drawings and diagrams. Rather than appointing one team captain, we encourage further specialization and trust in team members by having one person lead each of the three teams. Their task is to delegate tasks and manage subteam agendas. To facilitate communication between subteams and the

teachers, each subteam has at least two members whose job is to relay information to other subteams. Captains stay in touch with everyone to make swift changes, and others focus on coordinating with the necessary people to execute a specific task.

3) Discussions and Meetings

The team meets once a week with mentors and has separate discussions involving different members that the work calls for each week. During meetings with the mentors, conversation begins with subteam updates, priorities and tasks, and concludes with advice from the mentors. Sometimes this may be interviews of special guests. The team considers all problems from multiple viewpoints to create holistic possible solutions. After, it is the captains' responsibility to assign roles based on availability, preference, and skill. After this, discussions continue. Teammates, groups of two to six people, work together over multiple meetings for support and efficient communication. Captains also have their own meetings to discuss progress and readjust tasks after with the sub team meetings if needed. A secretary takes notes for each meeting and drops it in the Drive folder so everyone remains up to date regardless of availability. Through many layers of discussions and meetings, the project will be well thought out and progress effectively.

4) Communication

The team has a Drive folder for organizing documents and uses a team Gmail to reach out to other organizations. Quick questions are sent through a Hangouts chat, though major announcements are sent via personal emails. Every member routinely used Google based communication methods prior to InvenTeams, so this fits easily into every members' lives. Meetings with guests and mentors are done via Zoom because it is the standard of video

conferencing. Subteam and teammate meetings are done by personal preference. These can include Zoom, Google Meet, and FaceTime. The virtual workforce and easy syncing allows international students in different zones to work to their own schedule. In general, the team prefers to call on the phone rather than email or text because it is more time efficient for information given. Unless under extenuating circumstances, all actionables and outreach events are done over video or voice call.

Concept Phase:

June 2020	- Starting InvenTeam - Discussions of our passion and proposals
Mid July 2020	- Initial individual research for the problem.
Late July 2020	- Team structure, meeting frequency, and communication platforms decided - Define the first three sub-teams (Research, Outreach, and Design)
Early Aug 2020	- Final Application Started - Subteam work expanded - Flyer to the Deaf Centers of Nevada

Mid Aug 2020	- Research: Finish Final Application 1st draft
	  - First Draft by Aug 17 sent to master teachers for advice
	- Outreach: Contacting expanded
	  - Councilwoman Karla Brown got team in contact with Coach Debbie Ayres at CSD
	  - Talked with Ms. Ayres over Zoom Aug 12
	- Design: Patents Searches and Analysis, Exploring possible solutions and competitive technology

Aug 24	**SCHOOL STARTS**
Late Aug 2020	- Research: Final application Revision - Outreach: All partners finalized - Design: Existing technology analysis, technical components breakdown
Early Sept 2020	- Research: Analyze outreach data and form into build constraints - Outreach: Collaborate with partners to help us with the design

	- Build: Concepts/designs development
Sept 8	**FINAL APPLICATION SUBMISSION**

Input Phase:

Sept 2020	- Research: Organizing precedent research and identify different approaches to the concepts - Outreach: Continue collaboration to get user data - Design: Add CAD team to start modeling concepts; identify constraints; Continue concepts development - Technical Learning: Arduino, Methods of Wireless Communication, CAD
Early Oct 2020	- Concepts development; design evaluation from mentors and users - Subteams reassignment: Outreach, Design, and Build - Team bonding
Early Oct	**GRANTEES ANNOUNCEMENT**
Mid Oct 2020	- Design: Designs refinements and evaluation; develop CAD model and drawings; individual mechanisms testing - Outreach: Interviews with users; Understanding their needs; getting users feedback - Build: Individual mechanisms testing
Late Oct	- Outreach: Establish solid connection with users for future feedback; advertising and marketing it across the community; get feedback from community, users, and students - Design & Build: Start Physical prototyping

Output Phase:

Early Nov 2020	- Outreach: Communication with users; Receive users feedback - Build/Design: Develop Prototype for both visual and haptic
Mid Nov 2020	- Outreach: Users testing by mailing; Gather users feedback - Build/Design: Prototype development
Early Dec 2020	- Outreach: Look for competitive teams that may want to try it, also work with CSD to get large amount of user feedback - Build/Design: Data analysis and improvement of prototype 1
Dec 2020	- Outreach: More widespread testing(preferably all over CA) - Build: Prototype Phase 1 evaluation and feedback; Analyze

	effectiveness and defects
Early Jan 2021	- Outreach: Get ready for Mid-Grant Review - Build/Design: Prototype 1 refinements
Early Jan	**MID-GRANT TECHNICAL REVIEW**
Jan 2021	- Outreach: Prototype testing in-person if country opens - Build/Design: Analyze feedback from technical review, develop prototype 2
Early Feb 2021	- Outreach: Users feedback; Get ready for Mid-Grant Review - Build/Design: Prototype 2 evaluations and refinements
Early Feb	**MID-GRANT TECHNICAL REVIEW**
Feb 2021	- Outreach: Expand marketing and testing of product; Users feedback; Analyze empirical data; Marketing and establish connection with interested companies - Build/Design: Develop prototype 3; Testing; Prototype reiteration and refinements
Mar 2021	- Research: Consider getting a patent - Outreach: Reach out to larger audiences to distribute product - Build/Design: Finish Prototype 3; Prototype evaluations and feedback from mentors
Late Mar 2021	- Research: Patent research - Outreach: Large partnerships, allow for competitive play (ex. deaflympics) - Build/Design: Final Product Development
Early Apr 2021	- Research: Patent Requirements - Outreach: Continue trying to get approved competitively - Build/Design: Final product refinements; Start patent application
Mid Apr 2021	- All: Obtain Patent for finished final product; Work with Sports - Teams and Organizations to allow professional use; Final Product - feedback, evaluation, and refinements
Late Apr 2021	- All: Prepare for EurekaFest
May 2021	**EUREKAFEST 2020-2021 FOR INVENTEAM GRANTEES**