Preparing for Remote Inventing and Rapid Closure: Communication and Athletes With Hearing Loss

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The Quarry Lane School has implemented distance learning since mid-March, and will continue for the foreseeable future. Having experienced learning, communicating, and working remotely, the team has adapted and worked out InvenTeam conventions and duties.

1) Communication Between Teammates

To communicate efficiently, the team is implementing various technologies for different types of communication. For quick check-ins, questions, and general information, the team has a Google Hangouts group chat. It fits seamlessly into their lives because the team is accustomed to texting and checking messages daily on this platform already. Important announcements, such as task assignments or meeting schedules, are sent out through emails. Meetings are held on Zoom, which the students have been using since lockdown. Meeting notes are documented in Google Docs and organized in folders on Google Drive. Since all the team members primarily use Google accounts, Google based communication technologies are easily accessible to the Quarry Lane InvenTeam. The team also prefers to call each other for collaboration and discussion since it is the most direct and efficient form of communication.

2) Communication Between Community Partners

Outreaches and interviews are always carried out through Zoom. Documents and executive decisions are disseminated through email. Thus far, the team has established solid partnerships with the California School for the Deaf in Fremont and Camp Pacifica for the Deaf. The team plans on sending the device to our partners by mail with instructions and additional guidance through video calls. If conditions permit, the team will send one to two representatives to work with the athletes in person. During these in-person meetings, all state regulations for social distancing will be respected.

3) Prototyping and Product Fabrication

All parts and pieces will be modeled in CAD software, either Rhinoceros or OnShape. All students have experience in both programs from previous engineering courses. Each person will work individually on diagrams and/or models on Rhino and then upload these files to OnShape. OnShape will be the intermediate software, comparable to a CAD Google Drive for its syncing and collaborative facilities. An OnShape team was created for the InvenTeam so all the students will have access to it and can view as well as edit each other's work. The work assigned to each teammate will be based upon their strengths. With such a system, the team is confident that everyone is capable of supporting and encouraging one another whenever possible.

Prototyping is a critical part of innovating and revising, so shop access is imperative. The school has an extensive shop with 3D printers, laser cutters, CNC mills, and more. The team mentors are required to be on-site for remote learning instruction and have full access to the engineering shop. Therefore, the students can schedule with teachers to have work produced and delivered. In addition, one team member has equipment at home, specifically a laser cutter, two 3D printers, and a variety of power tools. It is unlikely that the school will close entirely, but in such case, the team will still be able to test and fabricate.

For example, one team member would design a component and the team member who owns a 3D printer would print and test it, later updating the entire team. Team members will order microelectronic kits and work in their own homes, with any discoveries being documented and shared with the rest of the team through calls and notes. Since most of the team live very near to one another, it is easy to transfer parts between teammates' houses by car. Parts will be dropped off in sanitized plastic boxes that can be reused. Prototype components can be

assembled separately at home and passed through houses so that everyone comfortable with doing so has a chance to physically test and work on the project.

With the methods aforementioned, the team is excited and optimistic about what they will accomplish together even under such daunting circumstances.