

# **Feasibility Report**

## **Team MGN**

**Joseph Olin, Ben Pister, Michael Roark**

### **Product:**

The Google Home Trivia App is a reusable trivia game framework for American Printing House for the Blind that will use Google Home devices to teach visually impaired students orientation and mobility tips. The intent of this app is to help accomplish American Printing House for the Blind's mission to promote the independence of blind and visually impaired individuals. It will do so by using the trivia app to better educate visually impaired and blind students in ways that will help them to adapt and overcome obstacles presented in daily life.

### **Technical Feasibility:**

Using the Google Actions SDK and Node.js will make it possible to make a trivia game. However, our project is more specifically creating a framework for quick and simple production of trivia games. The proposed system is that a developer will create a single JSON file which will be parsed into a new trivia game. This should be accomplished since the two structures follow a similar scheme. We are working alongside Team LER who is developing a similar product for the Amazon Echo and similar devices. The proposed system is augmented in a way that a developer only needs to create one JSON file to create two trivia games. This system is feasible and offers a great amount of flexibility in implementation and expansion. It also offers the possibility of creating an interface to deskill the creation of quizzes such that someone who only knows how to navigate webpages could use a webform to generate a quiz. This is an example of scalability and is not currently part of the design specifications.

### **Social Feasibility:**

Teachers and students will be positively impacted by this technology. A simple intuitive design with an extremely accessible interface will be ideal for the target demographic, visually impaired learners. The introduction of this new system would likely have a very positive impact on those that are visually impaired, as it will allow quicker detection and response vectors. However, those that have used braille for years and are confident with their existing system may need some reassurance. The teachers at APH themselves are not likely to be displaced by the development of the Google Home Trivia App. Rather, it is likely that teachers will use this system to augment what they are teaching their students regarding orientation and mobility tips. The teachers who use this system will also need to learn how to use the system so they can either use it themselves to teach or instruct students how to use it.

### **Economic Feasibility:**

There will be a great benefit realized with time and training. First of all, visually impaired people will have the benefit of keeping with those that are not impaired technologically. It will allow them to become familiar with a system that is most surely to grow in other aspects and offer them even greater benefit in mobility.

Monetarily, this will allow teachers to be more efficient with time spent with clients. It will likely, over time, reduce the cost in labor resources. Since trivia sessions are stored in a database, management will be able to review progress and see what teaching strategies work best, what their client base is comfortable with, etc.

Breaking down the cost:

- ☐ A Google Home is approx.. \$120.00 (Say 5 devices for a total of \$600.00)
- ☐ Amazon Standard Storage is \$0.023 per GB (First 50 TB/Month) (Say 30 TB for beginning for a total of \$690.00)
- ☐ Cost of development (Approximate 2 developers at \$55,000/year for a total of \$110,000/year )
- ☐ Cost of Field Testing (approximate at \$150,000/year)
- ☐ Total of above mentioned = \$261,290

Benefit in cost savings such as time, ease of teaching, etc. (I would approximate at a conservative \$80,000/year). There would also likely be an increase in clientele. Therefore, the Payback Period would be 261,290/80,000 for a final estimate of 3.27 years or 3years, 3 months.

### **Market Research:**

APH – American Printing House for the Blind was able to detail the need for the product and how that teachers' time was sometimes very limited and therefore could be made much more productive with an automated system to work with. We spoke with Larry, Director of Technology Product Research at American Printing House for the Blind, who is himself visually impaired. Larry noted to the authors that the idea of trivia and other learning tools using the Google Home would be very beneficial to such individuals.

Ben Pister located an online resource which gives an assessment of "Impact of Visual Impairment", Teaching Strategies, Assessment Strategies, and Tactile Graphics. Though this resource is Australian, he feels that it gives a fairly detailed description of the problem and solutions to the same. He especially found interest in their point that visually impaired people are often isolated and unable to customize their learning experience. This product will allow them to be collaborative and allow for customization in their learning experience.

Although there are many apps that assist visually impaired and blind people with mobility and orientation, there do not appear to be any apps that work to make these individuals more self-reliant via orientation and mobility training. This technology will be greatly beneficial in getting the most out of student-teacher interactions since they are so often kept brief. The brevity of these meetings are due to lack of resources, and students being taken out of regular class schedules to be instructed. Thus, there is a niche that the Google Home Trivia App can fill.

## **Alternative Solution:**

We have identified 5 possible alternatives:

Broaden the use of Braille keyboards, continue with the current system for instruction, use older legacy materials such as paper, an Apple/Android device app, or an audio series/podcast.

Broadening the use of braille keyboards would require more detailed training and that training would likely take much longer to realize the same level of results as a speech-based system.

Teaching using the current system has two pros, people are already trained in this method, and it requires no further development. But the major draw back is the training required for each individual wishing to enter into the field.

A pro to the physical paper solution is how familiar most people are with it. A major drawback is that it depends on the teacher being able to see. It precludes visually impaired teachers from being able to use the resource. The best teachers are those who understand us deeply, and this would be a great loss.

An Apple/Android app would remove the need to instruct teachers over and over again on how to administer the trivia game, and would also allow students to play the trivia game outside the classroom. However, mobile apps by nature are designed to work using touch and/or swipe events and are generally visual in nature. This could very well be an issue for visually impaired and blind users who would have to at least touch the device to play the game.

An audio series or podcast, while capable of serving a very similar role does not offer the same interactivity as a trivia game. The trivia game would be far more engaging and enjoyable for the students. Those factors mean a better chance at high retention of the material covered.

## **Project Risks:**

- ☐ Project specs/expectations not thoroughly discussed and/or understood.
- ☐ Architecture too loosely defined
- ☐ Architecture badly designed so that changes during development become a nightmare to incorporate.
- ☐ Possibility of limiting extensibility of functionality : Meaning, if not enough extension is allowed for, further development by Google to the Google Actions API may result in the need to build new project instead of just flowing with the new functionality.
- ☐ Not allowing for easy Q&A addition for the end users (those teaching and assisting the teachers.)
- ☐ Not testing software at necessary intervals: This can lead to a landfall of testing that will take much longer than it would if it were completed in stages.
- ☐ Testing criteria not defined to test program according to expected behavior.
- ☐ Once project is understood, a lack of understanding of task time could lead to grossly underestimating the project budget.
- ☐ Not making the vocal interface intuitive enough for the user, causing the project to be shelved and not desired by other potential customers.

- Using a development strategy that does not allow for changes to be incorporated throughout the development lifecycle resulting in changes being a massive undertaking.

These points are defined because if the project is not understood before starting out, there is no way to know if the proper system is being designed. If the solution is not defined correctly from the beginning, there may be a tightly coupled program that will cause a very difficult upkeep budget. If it is not allowed to be expanded by those using, then it is static and not a good solution in today's environment. If testing is not carried out correctly, then there is no assurance that the system meets the requirements and therefore may be a flop. If the development strategy does not allow for changes as the development progresses, there is potential for changes to become very expensive.

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