

Using Augmented Reality to Promote Informal Learning for Deaf Visitors of Museums

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Abstract:

- **Optimizing the use of augmented reality (AR) technology, this presentation discusses the preliminary data collected focusing on making STEM content accessible to d/Deaf and hard-of-hearing learners in “live” presentation settings found within museums.**



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Current Method:

- Providing communication and information to access to DHH museum visitors requires DHH learners to **split their attention** between the visual focus of the exhibit and the interpreter/captioning display.
- At any given point in time, DHH learners are forced to decide what **information to miss**, with subsequent effects on STEM topic comprehension and perceptions of the inclusivity and accessibility of STEM fields and informal learning environments.

Research Question:

- How can the use of **Augmented Reality (AR)** as a method of support service delivery improve the engagement of adolescent/teen DHH learners in semi-structured learning environments?

Informal Learning

- Museums
- Science Centers
- Zoo
- Aquariums

Taken into consideration

- Signed and speech explanation
- Captioned explanation
- Visual materials
- Environments

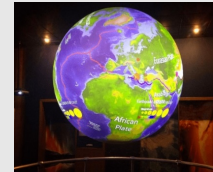
Example:

- The project has the potential to transform the experiences of DHH learners in informal settings.
- The target audience for this project is DHH learners ages 11-14.

- A live program offered at the Strasenburgh Planetarium



- A live program offered using Science On a Sphere®



- A live and interactive Challenger simulation program involving the spacecraft and a mission control simulator



Innovative Prototype:

- DHH visitors will be able to make **spontaneous** trips to museums instead of needing to arrange interpreting on-site ahead of time. Instead, remote ASL interpretation can be called in on the spot to facilitate communication.
- DHH visitors can **look freely** at the museum exhibits surrounding them without missing real-time information from a guide/instructor. They will not need to split their attention between the interactive exhibit and the interpreter/captioning display.
- Wireless technologies mean that DHH visitors can **move freely** about the museum, and ASL interpreters and captioners can remain stationary or even work remotely while providing services to DHH visitors throughout a large exhibit space.
- ASL interpreters and educational staff will be able to **see exactly** what DHH people are viewing through their MR prototypes, resulting in **better delivery of service**.

Current Methods in Museum:



Fig. 1. Without accommodation



Fig. 2. Live interpreter



Fig. 3. Real time human captionist – **onsite**



Fig. 4. Other option: Real time human captionist – **remote**



Fig. 5. live interpreter and real time human captionist

Potential Benefits of using AR Technology in Museum:



Fig. 1. Live interpreter



Fig. 2. Real time human captionist - **onsite**



Fig. 3. Real time human captionist – **remote**



Fig. 4. Automatic speech recognition captions by artificial intelligence

In the dark w/ interpreter:



Fig. 1. Without accommodation



Fig. 2. With interpreter



Fig. 3. Using AR Technology - With interpreter



Fig. 4. Artwork located far away from the interpreter



Fig. 5. Using AR Technology - Artwork located far away from the interpreter

In the dark w/ caption:



Fig. 1. With AR
Technology using
real time human captionist
- **onsite**



Fig. 2. With AR
Technology using real
time human captionist –
remote



Fig. 3. With AR
Technology using
automatic speech
recognition captions by
artificial intelligence

Example of a Situation:

- A live program offered at the Planetarium



Challenges:

- Real-time **captions** by human captionists

vs.

Automatic speech recognition **captions** by artificial intelligence

- How to communicate with others

