

Heuristic Evaluation of [Audio Reality]

1. Problem/Prototype

A mobile app and AR glasses interface that allows a deaf user to see captions for a class and identify who in the classroom is speaking.

<http://web.stanford.edu/class/cs147/projects/AssistiveTechnologiesandAccessibility/AudioReality/>

2. Violations Found

1. H2-4 Consistency & Standards / Severity 3 / Found by: A, C, D

The interface used the string “Save” on the first screen for saving the user’s profile, but used the string “Update” on the second screen. Users may be confused by this different terminology for the same function.

Fix: Use the same string on each screen.

[...list violations here with a blank line between each -- number from 1 to n, where n is total # of violations]

1. Searching for a class

- a. **H8 / Severity: 1 / Found by A, B** On Search, it is strange to see Matching Classes and Class not found when I haven’t searched for anything. This information is irrelevant and makes me wonder why it is there so it is a bit distracting. Fix: Remove those fields.
- b. **H4 Consistency and Standards / Severity: 3 / Found by B** When I arrived on the main screen, my first instinct (and what I did) was click Request a New Class, since that was the only button present, expecting it to be the functionality of finding a class that was already supported by the app (which is done by search). Fix: Don’t show the Request a new class button until the user has actually searched for a specific class. Or, make the “Class not found?” text more prominent and associated with the Request a new class button, so it’s more clear I should search first.
- c. **H1: Visibility of Status / Severity: 1/ Found by C** In the classes view, the app does not show a holistic list of all the classes offered. The only way you can find a class is if you know the name of the class and are able to type the name in the search bar. It would be much better if there was a list of all classes that users could scroll through, just so they are informed of all the classes offered. Otherwise, they are not informed of what is going on in the app.
- d. **H3 / Severity: 3 / Found by A, B** In Select a class, I cannot delete or go back. This limits my user control since I have to keep going forward or restart the app. Allow me to delete or to exit search.
- e. **H6 / Severity: 1 / Found by A** I am not sure of the differences between the classes. This makes me have to go to another place or to think about what

classes these are. Add title and/or descriptions of the class so that I can confidently choose the right one.

- f. **H3 / Severity: 3 / Found by A, B, C** I selected Math 3 but I cannot go back in case I chose it by accident. This limits my freedom. Add back or exit button.
 - g. **H1 / Severity: 1 / Found by A, B** After I scan the QR code with my glasses, I do not see a confirmation. It just starts showing text. The system should keep me informed with feedback although seeing text is like a confirmation. Perhaps add a confirmation with an option to start seeing text since I might not want to see text.
 - h. **H7: Flexibility & Efficiency of Use / Severity: 1 / Found by C** There are a lot of different pages on this app. It would help efficiency of use if there was a way for the app to remember what page the user was on the last time they opened the app.
2. Glasses
- a. **H4 / Severity: 2 / Found by A** I see blue text and red text but the directional cues only appear once the red text appears. This is not consistent so it made me wonder if the first blue text is not from the same speaker as the second blue text. Directional cue should appear for the blue text which appeared first.
 - b. **H3 / Severity: 3 / Found by A** I cannot close the text on the glasses which is something I may want to. This limits my user control. Add an exit button on the app.
 - c. **H1 / Severity: 1 / Found by A** When I am wearing the glasses and see text, I do not see that it is actively transcribing voice to text. I may think it is broken since I am not informed about the status. Add "...", loading, or listening text.
 - d. **H10 / Severity: 3 / Found by A** It is not clear what the app does since after I logged in, I just see select a class. It should provide a reason for searching for a class which is to be able to get captions. Such documentation would help and enhance the user experience.
 - e. **H10 / Severity: 3 / Found by A** The directional cues are not obvious that it is indicating who is speaking. Add a note in the beginning that that is the purpose. This documentation would ensure that the user knows how to use the directional cues. Otherwise it might be a distraction.
 - f. **H10 / Severity: 2 / Found by A** The reason for the different colored text is not obvious. Perhaps say that speaker A is blue and speaker B is red. This documentation could appear in the first use.
 - g. **H8 / Severity: 2 / Found by A** I see blue text, red text, and blue text which is covering my view of the background and I already read them. Perhaps just show the two most recent lines. This would agree with minimalist design of showing relevant information. Maybe record text as a transcript that can be viewed on the phone.
 - h. **H2 Match between system and the real world/ Severity: 1 / Found by B, C** On the AR glasses, the arrows directing the user to turn to the speaker can be a bit unclear. I also don't think the up arrows saying the speaker is in front is totally clear, since it's pointing up rather than toward the speaker. Fix: change arrow icon for speaker in front (a better icon like more 3D).

- i. **H5: Error Prevention / Severity: 2 / Found by C** Since the Wizard-of-Oz feature is being used to turn audio to text, there is a lot of room for error in terms of how it interprets speech. While the Wizard-of-Oz feature is figuring out what text the audio is saying, there should also be a verification feature that checks whether the Wizard-of-Oz feature was actually correct in how it interpreted the words spoken in class. After the class happens, someone should verify that the text transcribed by the app during lecture was correct. And if there was incorrect text, the user should be notified of this so that they do not receive the wrong information from their lectures.
3. Request Class
 - a. **H3 / Severity: 3 / Found by A, C** There is no way for me to go back from Select a class on the app which limits my control. I would have to use arrow keys which is available through Figma. Add a back button or home button.
 - b. **H2 / Severity: 2 / Found by A** When on Request Class, I am not sure what is Code and Number. These are not used in the real world. Perhaps ask for class code.
 - c. **H3 User control and freedom / Severity 2 / Found by B, C** Allow user to withdraw a request for a class that they might have mistyped or no longer require. Fix: have a list of pending requests that can be edited
 - d. **H10 / Severity: 3 / Found by A** When on Request Class, I am not sure what is Code and Number. Perhaps give an example of where to find Code and Number and the format.
 - e. **H5 / Severity: 1 / Found by A** To prevent adding a class accidentally, ask the user to confirm requesting the class.
 - f. **H7 Flexibility and efficiency of use / Severity: 3 / Found by B** If a user is enrolled in a class, they don't necessarily want to search for it every time they get to lecture. Provide functionality for a regular user to jump directly to a class they are enrolled in. Fix: landing screen could be QR code for that specific class, or there could be a list of enrolled classes rather than a blank list under the "Matching Classes" header.
 - g. **H1 / Severity: 2 / Found by A, B, C** After I requested a class, I did not see a confirmation and I went back to Select a class so I am not sure if that request went through. The system should inform the user of status. Add a confirmation or error page.
 - h. **H1: Visibility of Status / Severity: 2 / Found by: C** There is no way for users to see the status of their request. It would improve the app if they could see what step their request is in in terms of the approval process. It could be something as simple as a page that shows the classes the user has requested and a description next to the class name that says "sent," "undergoing review," "in preparation for app," etc. This way, the user knows whether their class request is actually being reviewed or not, and it just adds transparency in the request approval process.
 - i. **H9: Help Users with Errors / Severity: 2 / Found by: C** When users request a new class, there is no warning sign or pop up notification that shows up when the

class has already been requested by someone else but is still not available for viewing. If a class has already been requested by another student and is still undergoing review, there should be an error message that tells the student the class has already been requested.

- j. **H10: Help & Documentation / Severity: 2 / Found by : B, C** When the user sends in a class request, there is no additional information that the app provides in terms of what the next steps are for the request. After a user send in a class request, there should be a pop-up that tells the user what the next steps are. The app can notify the student of how the process usually works, how long it might take, etc.
4. Logging in as an admin
- a. **H4 / Severity: 3 / Found by A** I had to click on password field to login, instead of Login, which is not consistent with how I logged in as a student. I was confused by how to login as an admin. This shows a lack of consistency.
- b. **H3 / Severity: 3 / Found by A, C** After I filled out the student in Add Student, I could not click on Add Student or exit. Add both these options so I can have user control.
- c. **H5 / Severity: 2 / Found by A** I am not sure if the format I used is correct in Add Student. Add an error checker or confirmation.
- d. **H7 / Severity: 2 / Found by A** To save me time, allow me to select multiple students and approve them. Right now, I have to look at each student which takes time.
- e. **H4 / Severity: 1 / Found by A** In Device Detail, they use the term User but before they use the term Students. To be consistent and not make me think if they are different, use the term Student instead.
- f. **H3 / Severity: 2 / Found by A, C** On Device Edit, there is no way for me to go back or not apply changes. I must click Done so I feel I lost user control. Add a cancel button.
- g. **H3 / Severity: 3 / Found by A** After I left Device Edit, I am brought back to Device Detail where only Edit button works. I cannot go back to the home page which limits my user control. Make <Devices button work.

3. Summary of Violations

Category	# Viol. (sev 0)	# Viol. (sev 1)	# Viol. (sev 2)	# Viol. (sev 3)	# Viol. (sev 4)	# Viol. (total)
H1: Visibility of Status		3	2	1		6
H2: Match Sys & World		1	1			2
H3: User Control			2	6		8
H4: Consistency		1	1	2		4
H5: Error Prevention		1	2			3
H6: Recognition not Recall		1				1
H7: Efficiency of Use		1	1	1		3
H8: Minimalist Design		1	1			2
H9: Help Users with Errors			1			1

H10: Documentation			2	3		5
Total Violations by Severity		9	13	13		35
Note: check your answer for the green box by making sure the sum of the last column is equal to the sum of the last row (not including the green box)						

4. Evaluation Statistics

Severity / Evaluator	Evaluator A	Evaluator B	Evaluator C
sev. 0	0%	0%	0%
sev. 1	66%	33%	33%
sev. 2	62%	23%	54%
sev. 3	77%	31%	23%
sev. 4	0%	0%	0%
total (sev. 3 & 4)	77%	31%	23%
total (all severity levels)	69%	29%	37%

***Note that the bottom rows are *not* calculated by adding the numbers above it.**

5. Summary Recommendations

There are many places in the current prototype where we are unable to go back to the last screen, as well as fix errors we may have made in adding or requesting a class. This is important in accordance with Heuristic H3. Examples are the QR code page where we cannot return to the search list, and being unable to cancel a request if it was made by accident. This would make us have to restart the app.

A user guide or walkthrough could help with understanding how to use this app since this is a novel app. This would address H10: Help and Documentation and H2: Match between system and the real world. For example, explain why I would be searching for a class. Then when I request a class, explain what is Code and Number. Another example is when I on Request Class, I am not sure what is Code and Number and where to find this information. Also, I would have liked to know what happens after I send in a class request like if I need to do anything or how I will be notified.

One of the biggest errors we found was definitely a lack of visibility of status (H1) in the class request process. The app did not offer much transparency in terms of the class request process for the student. Once they requested a class, there was no way for them to see whether it was under review, what the next steps were, or whether their request was even sent in in the first place.

There is a lot of clicking and having to go through many pages which is related to H7. For example, students have to be approved individually. Perhaps think of how that can be done faster like add the ability to select all or some on that page.

There is no feature that allows users to ask professors questions during lecture. While it might not be the point of the app, it would be helpful if there could be some way for students to ask questions through the app and for the professors to be able to see it live-time during class.

Severity Ratings

- 0 - don't agree that this is a usability problem
- 1 - cosmetic problem
- 2 - minor usability problem
- 3 - major usability problem; important to fix
- 4 - usability catastrophe; imperative to fix

Heuristics

H1: Visibility of System Status

- Keep users informed about what is going on

H2: Match Between System & Real World

- Speak the users' language
- Follow real world conventions

H3: User Control & Freedom

- "Exits" for mistaken choices, undo, redo
- Don't force down fixed paths

H4: Consistency & Standards

H5: Error Prevention

H6: Recognition Rather Than Recall

- Make objects, actions, options, & directions visible or easily retrievable

H7: Flexibility & Efficiency of Use

- Accelerators for experts (e.g., gestures, kb shortcuts)
- Allow users to tailor frequent actions (e.g., macros)

H8: Aesthetic & Minimalist Design

- No irrelevant information in dialogues

H9: Help Users Recognize, Diagnose, & Recover from Errors

- Error messages in plain language
- Precisely indicate the problem
- Constructively suggest a solution

H10: Help & Documentation

- Easy to search
- Focused on the user's task
- List concrete steps to carry out
- Not too large