

## Assignments — Week 11 | Design | Designing for Accessibility



In this assignment, we will explore some of the concepts we learned about in class around *accessibility*. Specifically, we will try to better understand how accessible design and assistive technologies are implemented in existing mobile platforms and design accessibility features for our Module 2 deliverable fitness app. You will choose a mobile platform and analyze its accessibility features and build on this understanding to specify similar features for your app. You may have to do some online research map impairments to design requirements, as how the accessibility features on the mobile platform work in different situations may not be clear. The premise of the assignment to think about how accessibility features work at the lower level and how we might implement them in our designs, so your focus should be on the mappings between impairments and accessible design features. You can be creative with your designs, but they should also be feasible (e.g., enlarging buttons is feasible, but predicting calories from a photo is not).

**Part 1. Discovery.** In this part of the assignment, you will discover the accessibility features of mobile platforms. You will choose (1) *a mobile platform*, such as a mobile device or a tablet computer, running iOS, Android, or an alternative operating system and (2) *an existing app* from any domain (e.g., fitness, weather, social media, news). Analyze the accessibility features in the general settings of the device to choose one from each of (a) *vision*, (b) *physical/motor*, and (c) *hearing* assistive technologies. Define a core task for the app (e.g., entering food into a fitness app, adding a new city into the weather app, posting on social media, or adding a new news feed) and perform the task a total of four times, first with all accessibility features disabled and then by enabling them one by one. Analyze how the app behaves differently with each assistive technology and describe the changes you noticed either in narrative form, dedicating one paragraph for each assistive technology, or using annotated screenshots. Pay particular attention to (1) any changes in how the components appear and behave and (2) the addition of other components, elements, or behaviors.

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<choice-of-platform-app-task>

## IOS – Apple News Application - “Play a news video from the Top Stories from the News app”

<choice-of-assistive-technologies>

(a) Vision: VoiceOver

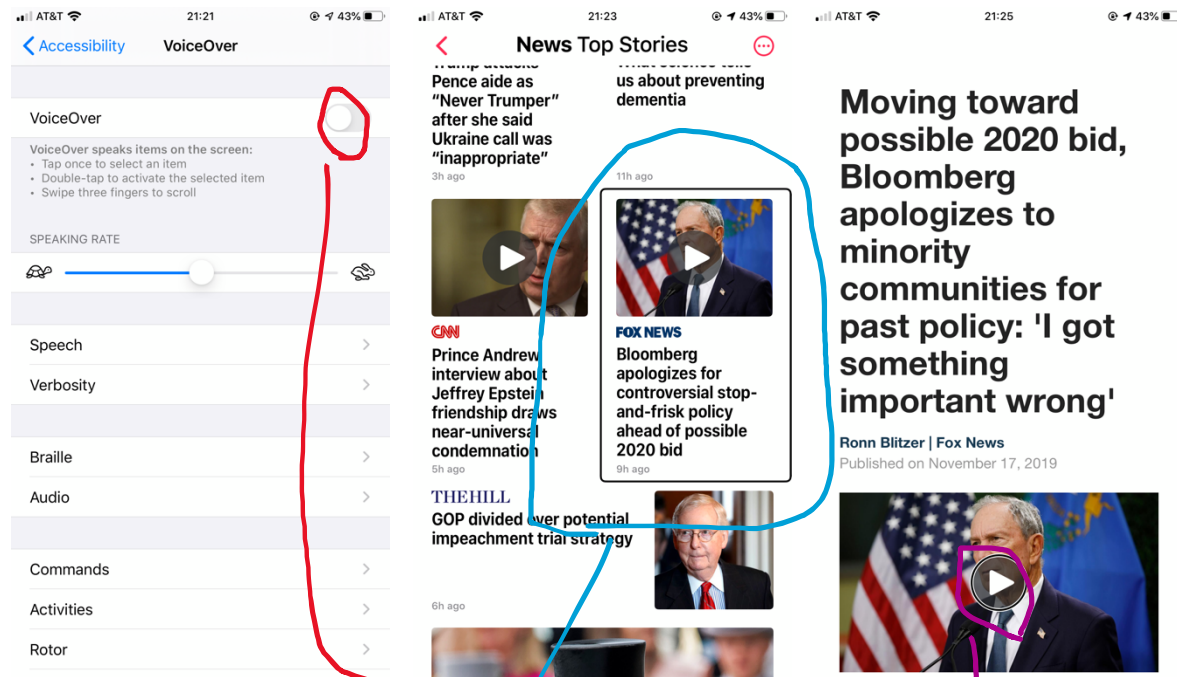
(b) Physical/motor: Voice Control

(c) Hearing: Audio Balance

<analysis-in-narrative-or-annotated-screenshot-form>

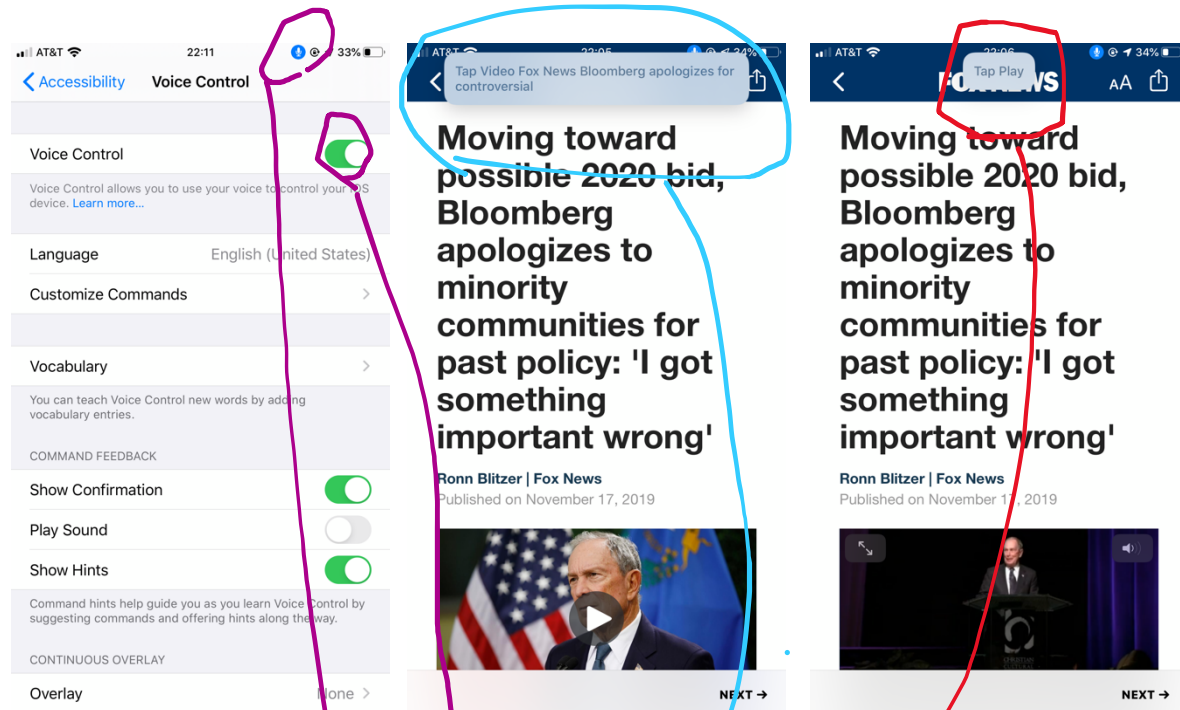
The task for accessing these three accessibility features is using news app to play a video news from the Top stories.

### (a) Vision: VoiceOver



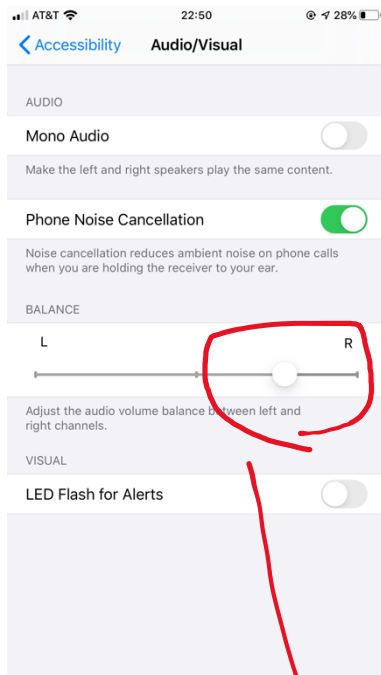
This is an accessibility feature that benefits to the people who have vision problem. The user could turn on this feature from the accessibility settings as shown in figure 1 above. Compared to the normal model, after turning on the VoiceOver, it appears a block with black boarder on the section you are touching on. No matter which area you are clicking, the system will show a black box and response with speaking the word inside those boxes as shown in figure 2 above. The user also has the chance to hear the feedback from a large section or section by lines which gives the flexibility in using it. If the user wants to get into the news, they need to double click the box area. This also applies to the place and pause button for the video section of the news as shown in figure 3. Every time when user double clicks to confirm an action, the system will response with a short “click” song which provides the feedback to let the person who has vision problem know the status of the system.

## (b) Physical/motor: Voice Control



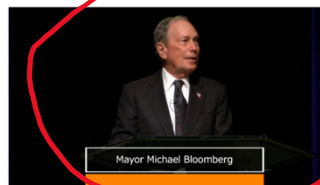
This is an accessibility feature that benefits to the people who have physical disability and have hard time to touch the screen to use and have interaction with the device. The user could turn on this feature from the accessibility settings as shown in figure 1 above. Compared to the normal model, after turning on the Voice Control, there is a microphone icon with a light blue background color appear on the tools bar on the top of the screen as shown in figure 1 above. The user could say "Tap News" to open the application or any interaction they want have by using the command. After executing the command, the first thing change is the screen which will behave like you are clicking or tapping the screen. Then after finishing execute the command, there will be a shadow notification pop up on top of the screen showing the command user just ordered as shown in figure 2 above. In addition, the user also could use the voice control to play or pause the video as shown in figure 3 above. This feature definitely helps the user who cannot user hand to touch the screen. However, it may take extra time for system give back the response.

### (c) Hearing: Audio Balance



### Moving toward possible 2020 bid, Bloomberg apologizes to minority communities for past policy: 'I got something important wrong'

Ronn Blitzer | Fox News  
Published on November 17, 2019



Former New York City Mayor Michael Bloomberg

This is an accessibility feature that benefits to the people who have hearing balance disorder and have hard time to hear the sound which have the same balance. The user could turn on this feature from the accessibility settings as shown in figure 1 above. Compared to the normal model, after switching the sound balance toward right soundtrack, the playing sound will have different configurations. When use open the video sounds from the News App, the video will still play with the same content. However, in this scenario, the left soundtrack will have less volume compared to the right one. This sound balance change could help those disability people to have a balance hearing feeling as the normal people. In addition, it could also work for people who have disability in of their ears. The only behavior change of this accessibility is the sound change which are hard to show in a screenshot as figure 2 above. However, it benefits the people who have hearing issues.

**Part 2. Design.** In this part of the assignment, you will build on your understanding of how assistive technologies work from Part 1 to practice accessible design for your fitness app. You will choose one *permanent impairment* and one *situational impairment* that you would like to target with your app. Determine the design requirements (what should the app do or not do to offer users with these impairments a similar experience) for each impairment using one or a combination of the following: (1) your observations of how assistive technologies worked in Part 1; (2) quick-and-dirty online research you can do about the effects of these impairments on mobile device use; and (3) novel ways in which you can think of addressing the impairments. Choose a task that your app will support and prepare wireframe screenshots (1–3 screens, depending on the task) of your app, demonstrating the task. Create two additional versions of the screenshots that implement accessible design features for the impairments. Annotate these versions to highlight and describe the features.

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<choice-of-impairments>

**Permanent impairment: See**

**Situational impairment: See**

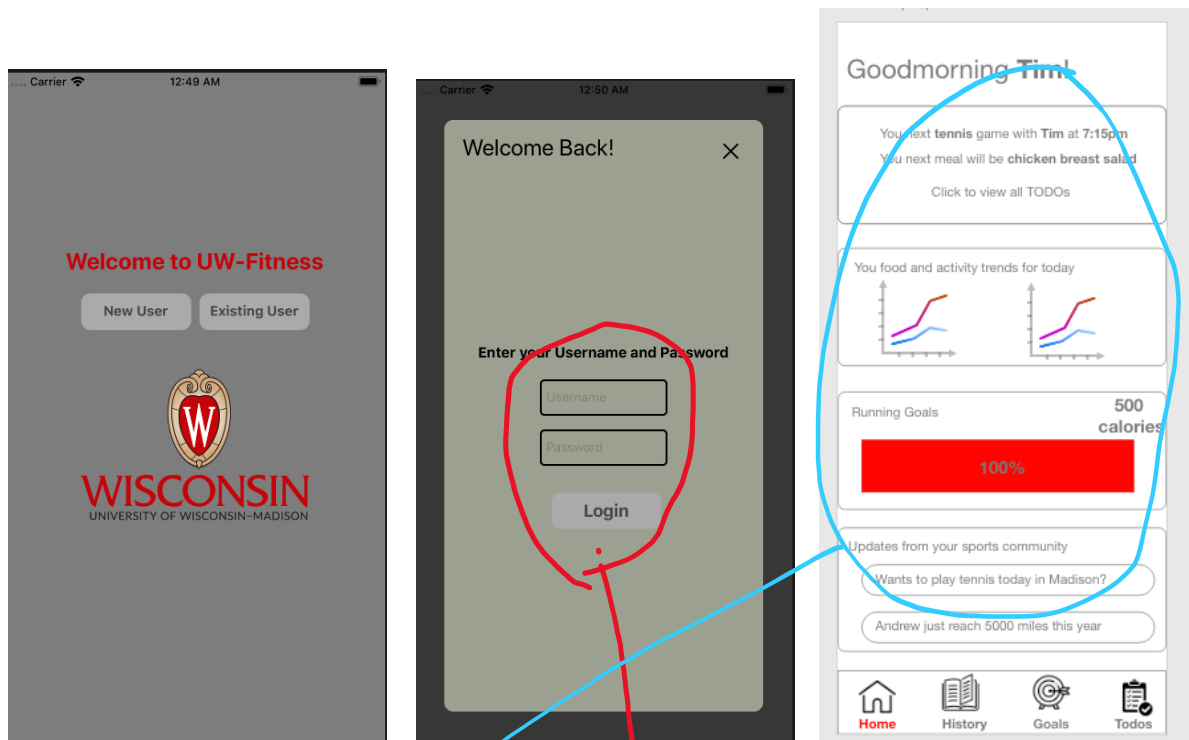
<design-requirements>

**Similar to the vision disability as mentioned in part 1, the both impairments happen in the context of user cannot see the screen or have a clear vision on the screen. Thus, I decide to implement a feature that similar to VoiceOver in IOS platform which could talk to users about the system status and read the words on the screen.**

**For the permanent impairment, according to the observation of how assistive technologies worked in Part 1, I found the most important part is that the user cannot see the screen. Thus, all the information exchange will base on the interaction between human and touch screen with sound. Another novel way to address the impairment is through the vibration of the phone. Since the user will only have the disability on vision, it still possible to add some interaction involved with vibration in order to provide a correct and clear feedback to user. Thus, the interaction with sound and vibration becomes a requirement for the users.**

**For the situational impairment, according to the observation of how assistive technologies worked in Part 1, I found that user who are in special situation, such as working out, or running, have a hard to time to look at the screen and read each word very clearly. Thus, it's important to maintain the interaction between user and devices without using the vision. Since the wireless earphone is really popular in 21<sup>st</sup> century, in this case, it's easy to have a sound interaction with those users. Thus, using sound become a requirement for the situational impairment.**

<annotated-wireframes>



The task for the user is to log in and find the summary information of their current day. Typically, the user needs to look at the screen, log in by typing the username and password, and find the reports on their own by seeing information. However, this could be impossible for both permanent impairment, and situational impairment users, since both of the group will not have a clear view on the screen. Thus, it's important to add some accessible design features that involve less vision interaction with the application.

< Additional versions of the screenshots >



However, with the summary sound, the app will announce the summary to user through using sound and vibration. This accessible design features will provide the help for user who are permanent impairment, or situational impairment. Because they don't need any visual interaction with the screen anymore. In addition, the touch ID feature provided by iPhone could help user save the time to login to the current day page.

In details, the user who are permanent impairment can log in the app by using the touch ID. Since they are blind and cannot see the screen, they could use the summary sound accessible design features to help them read out the activity and nutritional summary of current day. What they need to do is just double click the screen on the home page, then the device with response by start to say the summary with a vibration feedback. After finishing speaking, the device also sends another vibration to remind user that it has finished the report. This feature is really helpful for the user who still want to track their body status but cannot see the screen.

The user who are situational impairment can still have the chance to look at the screen. But they could not read each word very clearly due to the restriction of the circumstances around them. For example, if a user is running on the road, but he still wants to check his activity status. It may hard for him to see the detail number. In this scenario, he can turn on this summary sound accessible design features. With the help of it, he can just double tap the home screen and then the sound will be played through the user's wireless earphone. They can go back to focus on their activity instead of interacting with the application. Thus, it's not only benefits to the permanent impairment users, but also to the situation impairment users.