

(Re)Creating the Past in Accessible Ways



Agenda

- About Deb
- 4 Things
 - Accessible Experiences
 - User Control
 - Change Over Time
 - Multiple Interpretations
- Q&A



About Deb

- Accessibility Technologist
- 4 years XR Experience
 - Currently focused on enterprise adoption and use of XR in museums/education
- Master's in Ancient Cultures and Information Technology
- www.debmayers.com



4 Things

1

Accessible Experiences

Around 15% of the world has some type of disability¹

22% of the UK population reported a disability²

2

User Control

Customization can lead to more time spent in experience, and really helps users with disabilities

3

Change Over Time

Everything changes with time, XR experiences should not focus on one set period

4

Multiple Interpretations

We can never know exactly what the past was like

Accessible Experiences



Definitions

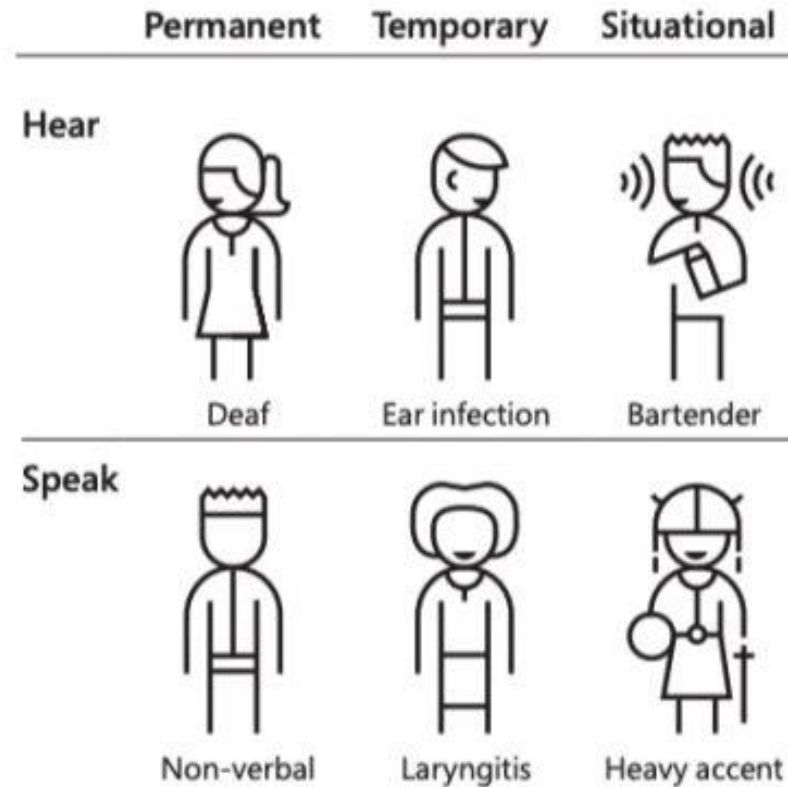
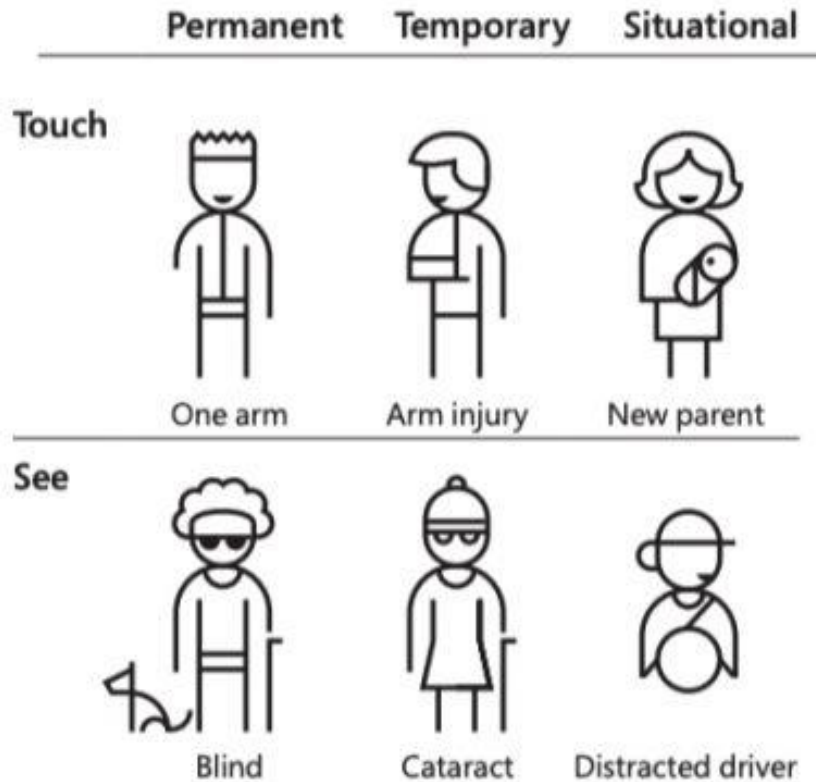
Models of Disability

- **Medical Model:** Disability is related to an individual's body. Disability may reduce the quality of life and needs to be treated by medical professionals.
- **Social Model:** Disability is the restriction that is caused by society with lack of accommodation. Inclusive designs can remove barriers that people with disabilities face.

Accessibility

- Making products usable to as many people as possible.

3 Types of Disability



<https://uxdesign.cc/women-in-ux-kat-holmes-8f1f93909730>

XR Accessibility

Audio:

- People who are deaf
- hard of hearing
- in an arcade
- in a museum
- in a quiet place without headphones

Cognitive

- People with cognitive disabilities
 - anxiety, depression, dyslexia, autism, adhd,
- people who had a bad day
- people who get distracted

Mobility:

- People with mobility disabilities
- get motion sickness
- people with kids/pets at home
- small living spaces

Visual

- People who are blind
- low vision
- get motion sickness
- Using AR in a sunny area
- Sore eyes from playing in VR
- using VR to get rid of pain

What to do?

Include People With Disabilities!!!

Use the senses

- Visual
- Aural
- Haptics
- Scent to an extent
- Taste?

Check out Guidelines:

- [XRA Developer Guidance](#)
- [W3](#) (Immersive captioning, User Requirements)
- [Oculus VRCs](#) (NB Audio Description is missing)
- Communities:
 - [XRAccess](#), [A11YVR](#), [Equal Entry](#)

Visual Guidelines



- Display text on a background, and at a suitable distance (no closer than 0.5 meters away)
- Color Contrast (4.5:1)
 - Color Blindness, Low Vision, Cognitive Disabilities
- Text Size
 - Low Vision, Cognitive Disabilities
- Limit flashing/blinking content
 - Cognitive Disabilities, Prevent seizures
- Interactable objects are large enough to see/interact
 - Low Vision, Cognitive Disabilities, Mobility Disabilities

Audio Guidelines



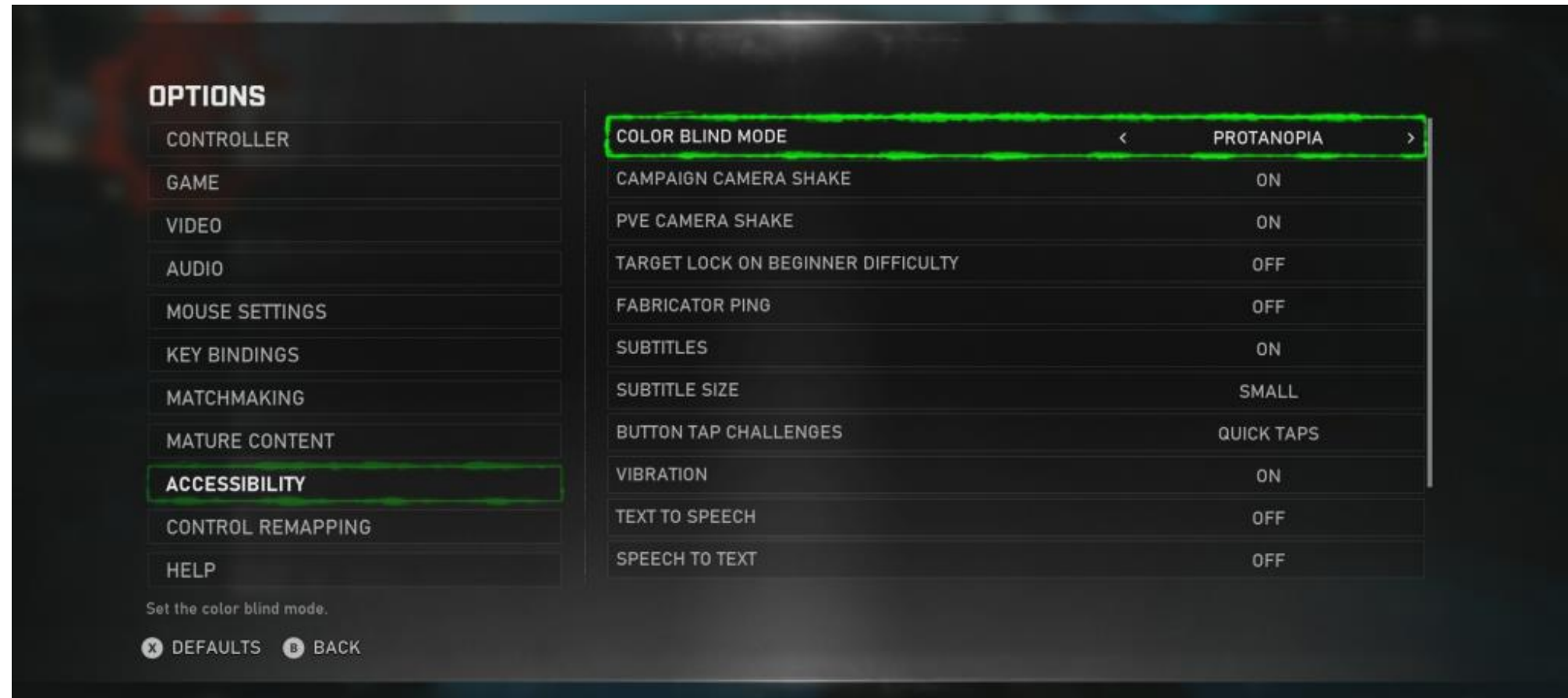
- Important sounds are displayed with text
 - Deaf, Hard of Hearing, Cognitive Disabilities, Low Volume, Noisy Environment
- Captions are displayed appropriately, and allow user to change
 - Deaf, Hard of Hearing, Cognitive Disabilities, Low Volume, Noisy Environment
- Sign language (hand tracking)
 - Deaf, Hard of Hearing
- Transcripts are available for users (Can you use haptics for braille??)
 - Deaf-Blind

Mobility Guidelines



- Accurate scale of user
- Seated, Standing, or Room Scale
 - Users with mobility disabilities, users with small spaces
- One handed mode
 - Users with mobility disabilities, users holding something
- Multiple Inputs (keyboard, controllers, hands, eyes, voice, switch devices)
 - Users with mobility disabilities, users with visual disabilities, users with auditory disabilities, all users

User Control



Settings

- Ability to change:
 - Colors
 - Text Size
 - Locomotion
 - Seated/Standing
 - Input (hand, voice, keyboard, controller)
 - Verbosity of narrative
 - Background noises/animations
 - Captioning/Language
 - Sensitivity of the camera



Photos: [BeatSaber Steam Store](#), [Owlchemy Labs Twitter](#)

Settings for Visual Disabilities

- Audio description
- Non visual way to know when something is interactable
- Larger text size
- Ability to scale/zoom
- Different colors
- Turn off background animations/noise



Settings for Aural Disabilities

- Captions
- Important sound effects are also visual/haptic
- Mono Audio and Spatial Audio
- Sign language
- Transcripts

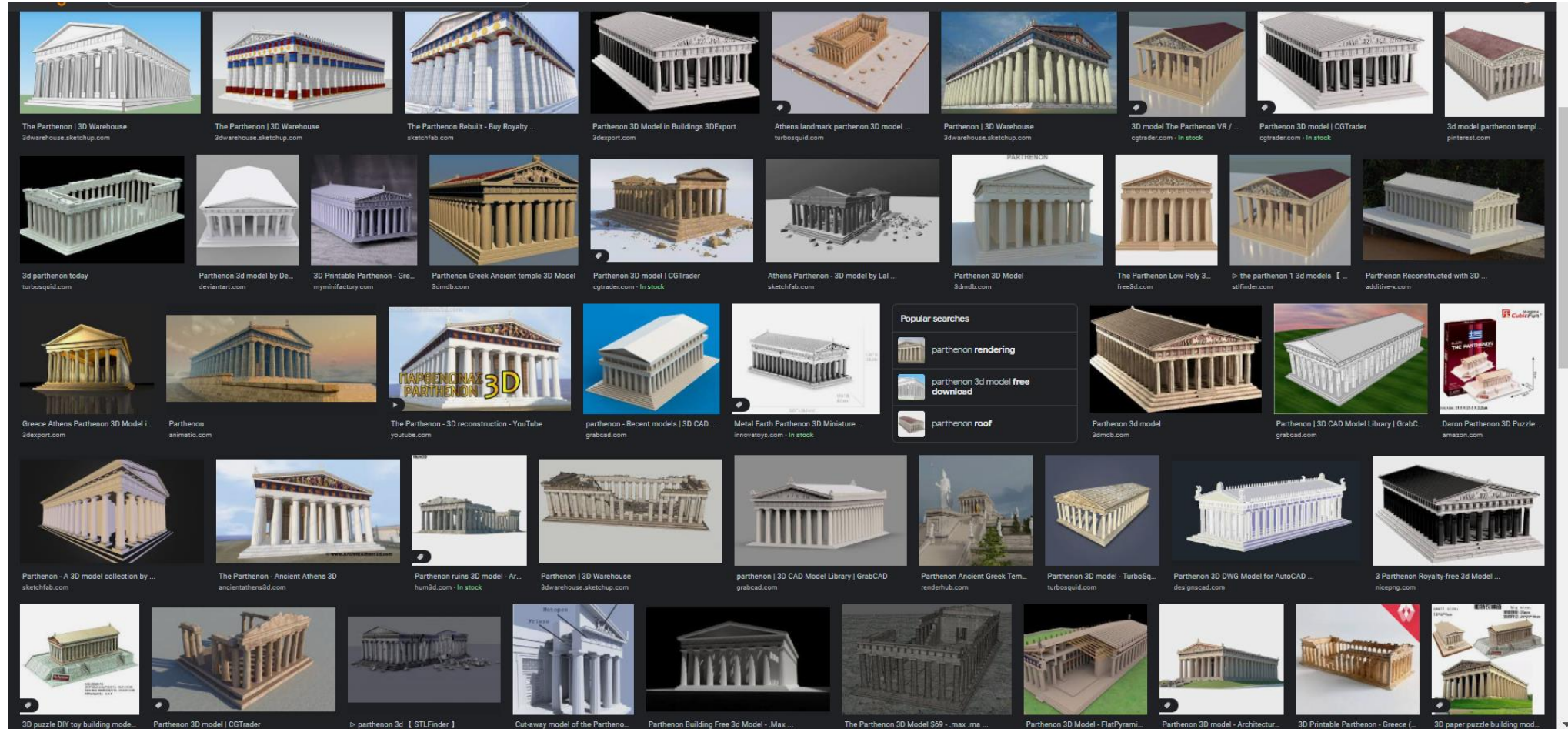


Settings for Mobility Disabilities

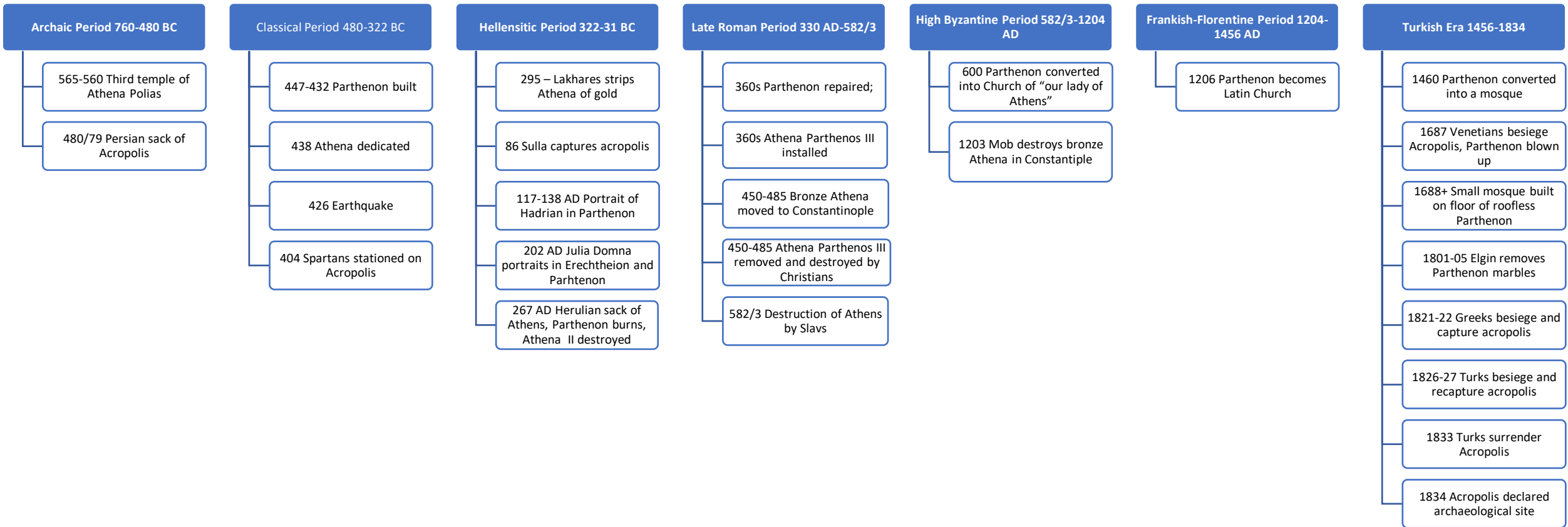
- Seated, standing, or room scale
- One handed mode (users can pick which hand)
- Multiple inputs (keyboard, hands, controllers, voice, switch (foot rudder))
- Allow a good target size (if someone's hand shakes, can smooth that out in XR experience and have large targets for interactable objects)



Change Over Time – The Parthenon



Parthenon Timeline (Hurwit, 1999)



Which is more important?



Multiple Interpretations

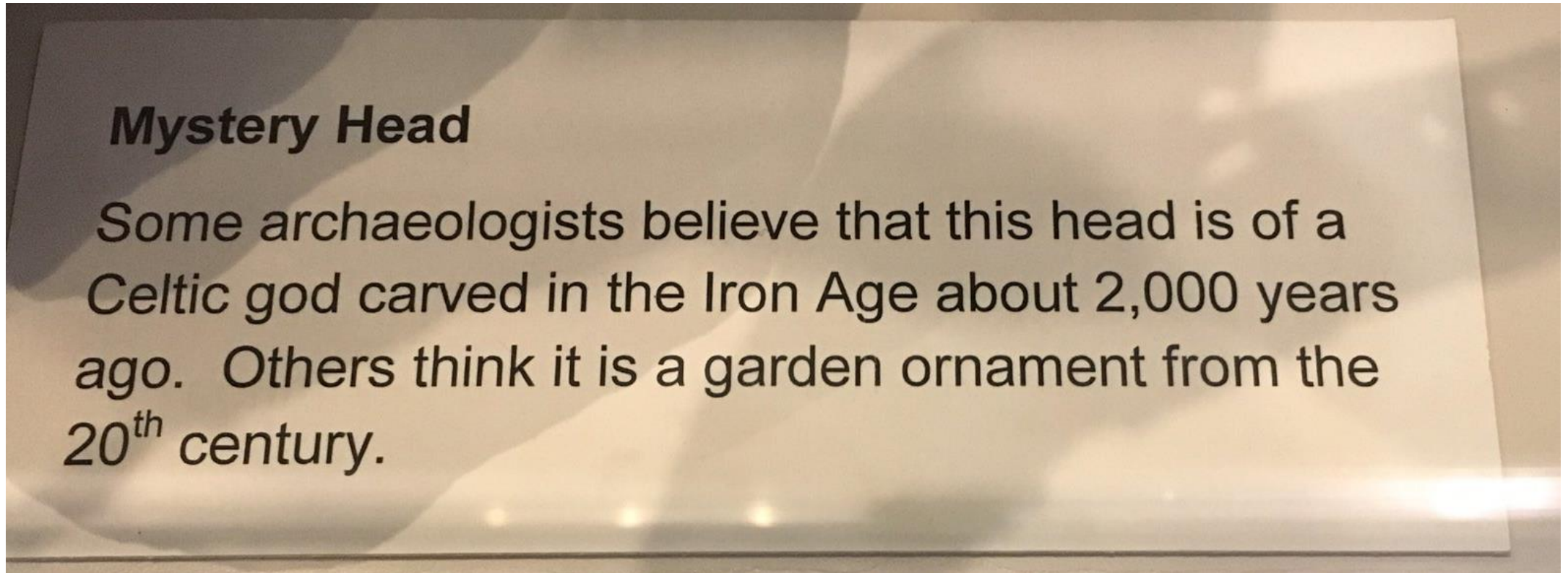


Photo: [Ancient Tokens Twitter](#)

Multiple Interpretations – Marcus Aurelius



References

1. <https://www.who.int/teams/noncommunicable-diseases/sensory-functions-disability-and-rehabilitation/world-report-on-disability>
2. <https://www.gov.uk/government/statistics/family-resources-survey-financial-year-2019-to-2020/family-resources-survey-financial-year-2019-to-2020#disability-1>
3. Hurwit, J.M. 1999, *The Athenian Acropolis: History, mythology, and archaeology from the Neolithic era to the present* Cambridge University Press Cambridge UK

Q&A

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1. Accessible Experiences
2. User Control
3. Multiple Interpretations
4. Change over time