

# Bring-Your-Own Input: Context-Aware Multi-Modal Input for More Accessible Virtual Reality

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Full Text

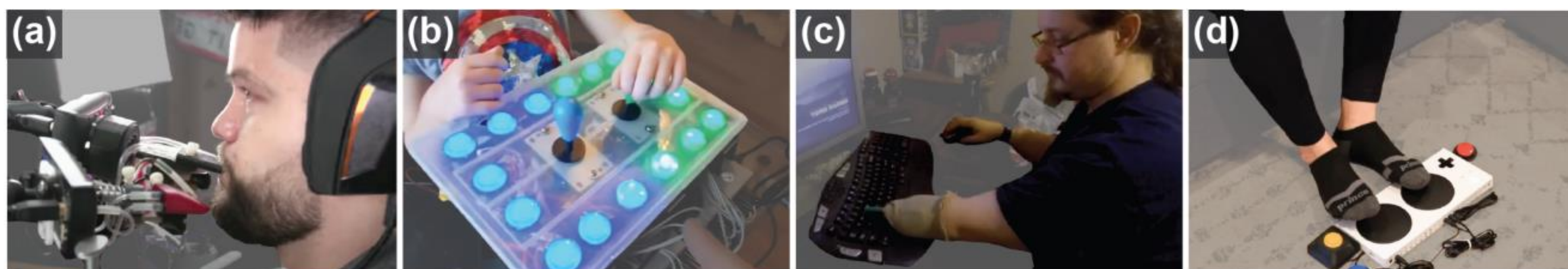
## Background and Main Question

VR makes **ability assumptions** that may be uncomfortable or even impossible for **people with limited mobility** to meet.

Other computing formats like desktop and mobile have mechanisms for accepting input from **preferred or adaptive input devices**. Users also often combine input devices, creating **multi-modal** input setups to overcome accessibility barriers (*examples below*).

**VR is a much more gestural language**, involving several input **degrees-of-freedom**. We can use **context** (body posture, space, display device) as an additional input stream to this end.

**How can we combine devices, modulated by context, to enable accessible VR input for people with limited mobility?**



Originally Figure 1 from Wentzel et al., CHI 2022

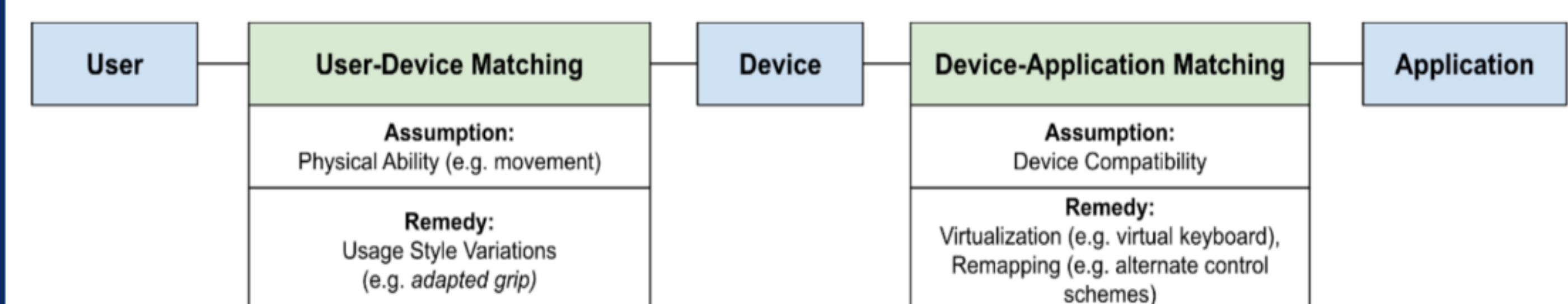
## Project 1: Accessible Multi-Modality

**People combine devices to overcome accessibility barriers, but input configurations vary widely. Address the “long tail”!**

Conducted a **three-part exploration** into how people with mobility limitations combine input devices.

1. **Survey** about input devices used and individual combinations
2. **Semi-structured interviews** about challenges and remedies
3. **Systematic analysis of YouTube videos** to simulate discovery process

Accessibility issues often appear in the **user-device-application matching process** (*below*), and users develop custom input remedies for their individual issues.



Originally Figure 6 from Wentzel et al., CHI 2022



Paper (CHI 2022)

## Project 2: Device-Agnostic VR Input

**How should a system adapt its input processing to accommodate the wide variety of accessible input combinations?**

We categorize input using the form:

**x D + y**

**Continuous dimensions**  
(mouse movement, joystick)

**Discrete dimensions**  
(mouse buttons, keyboard keys)

**Current study plan:**

1. **VR demonstration workshops** with people with mobility limitations
2. **Co-design sessions** to elicit input needs for VR, input categorizations
3. **User study** for accessible low-fidelity VR input (2D+1, 1D+1, 0D+1)



## Project 3: Context-Aware VR Transitions

**How does a change in the user's input scenario affect 3D task fidelity, and how can interfaces accommodate these changes most effectively?**

Investigating the effect of **context** and **context transitions** on task completion in a **cross-reality environment**.

Proposes a design space between all combinations of **body posture** (seated/standing), **space** (stationary/roomscale), and **display** (VR/desktop).

User study focuses on **using context as an additional input stream** when physical controls are insufficient.

