

Introduction

- Authentication to computing devices typically require users to perform complex actions with their arms, hands, and fingers

- For example: complex passwords, positioning a camera accurately for facial recognition



- This can create barriers for people with upper extremity impairment (UEI)

- People with UEI experience reduced range of motion, strength, endurance, speed, and/or accuracy associated with movement in the shoulders, upper arms, forearms, hands, and/or fingers

Methods

- Semi-structured interviews with 8 participants with UEI
- Interviews were conducted at a location chosen by the participant
- Each interview lasted between 30-50 minutes

ID	Age	Gender	Disability
P1	58	Male	Multiple sclerosis
P2	21	Female	Cerebral palsy
P3	76	Female	Quadriplegia from Guillain-Barré syndrome
P4	59	Male	Spinal cord injury
P5	65	Female	Amputation due to complications from virus
P6	50	Female	Cerebral palsy
P7	37	Female	Cerebral palsy
P8	46	Male	Cerebral palsy

Findings: Most biometrics are not well suited to the abilities of people with UEI

Two of our participants wanted to use the fingerprint sensors on their devices, but neither of them type with their fingers. They both attempted, unsuccessfully to use toe-print and nose-print respectively as a workaround.



"I...got my nose print. But it wasn't accurate." (P2)

Research Questions

- How and why do people with UEI use (or not use) authentication with their personal computing devices?
- Where (if anywhere) in the authentication process do barriers arise and how do people with UEI work around those barriers (if at all)?

Findings: Most of our participants used authentication



- Only two participants had disabled authentication on all their current devices
- All participants who used authentication used passwords or PINs on at least one device
- Only two participants used biometrics

Opportunities for Future Research



Evaluating AT in a security context for password/PIN entry



Promoting interdependence through shared credentials with caregivers



Designing biometrics which meet the needs of people with UEI

Related Work

Authentication presents challenges to people with UEI, however, research into the experience of authentication for people with UEI has thus far been limited

Studies on use or interaction with various forms of authentication for people with disabilities including some with UEI (Blanco-Gonzalo et al. 2018, Helkala 2012, Kane et al. 2020, Renaud 2018, Singh et al. 2007)

Various work has begun to create better authentication for people with UEI. Our work can help inform future work in this area

Studies on novel credentials and credential verification for people with UEI (Johnson et al. 2013, Lewis et al. 2020, Shen 2008, Damopoulos and Kambourakis 2019, Fuglerud and Dale 2011, Zhu et al. 2009, Fenner 2018)

Findings: Long, complex, secure passwords/PINs are difficult for people with UEI to use

Participants reported that they would workaround the difficulty of using complex passwords by choosing passwords which only used letters on one side of the keyboard or were shorter or simpler.



"[Passwords] require...many different digits...You need to press more buttons...[You had to] press Shift at some point because you had to do [capital letters]. You had to do numbers and whatnot. So they're much more complicated [and] it's much more unforgiving." (P6)

Conclusions

- The current authentication process on computing devices is inaccessible to people with UEI
- Currently, barriers occur across the entire process and people with UEI prioritize usability over security in order to compensate for it
- Future research is necessary to make authentication accessible to people with UEI.