



Dyslexia & Password Usage: Accessibility in Authentication

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A variable font empirically shown to significantly improve reading-proficiency.

Working with Dr. Bonnie Shaver-Troup, utilizing her theory and the LEXEND beta font designs, educator and type designer, Thomas Jockin began formulating an advanced set of typographic variables to coordinate with one simple idea:

A font, much like the prescription in a pair of eyeglasses, should change based on the reader's unique needs.

Combining some of the newest technology in font software and an educated history in professional type design, the

DECA • LXND 0

LEXEND

EXA • LXND 40

LEXEND

GIGA • LXND 56

LEXEND

MEGA • LXND 64

LEXEND

Fernando Corbató

- Corbató's Compatible Time-Sharing System (CTSS) allowed multiple users (1961)
- Users needed personal accounts to securely access their private files
- Enter ... the password



USERS ARE NOT THE ENEMY

Why users compromise computer security mechanisms and how to take remedial measures

Confidentiality is an important aspect of computer security. It depends on authentication mechanisms, such as passwords, to safeguard access to information [9]. Traditionally, authentication procedures are divided into two stages: *identification* (User ID), to identify the user; and *authentication*, to verify that the user is the legitimate owner of the ID. It is the latter stage that requires a secret password. To date, research on password security has focused on designing technical mechanisms to protect

access to systems; the usability of these mechanisms has rarely been investigated. Hitchings [8] and Davis and Price [4] argue that this narrow perspective has produced security mechanisms that are, in practice, less effective than they are generally assumed to be. Since security mechanisms are designed, implemented, applied and breached by people, human factors should be considered in their design. It seems that do not have to write them down). The U.S. Federal Information Processing Standards [5] suggest several criteria for assuring different levels of password security. *Password composition*, for example, relates the size of a character set from which a password has been chosen to its level of security. An alphanumeric password is therefore more secure than one composed of letters alone. Short password

ANNE ADAMS AND MARTINA ANGELA SASSE

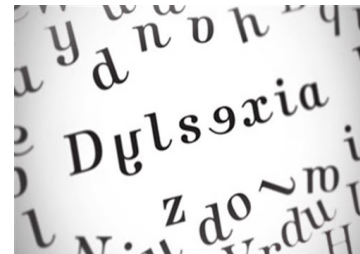
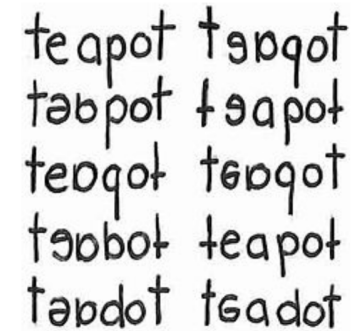
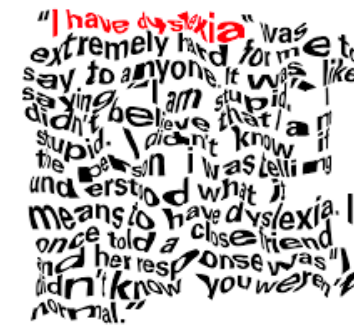
Dyslexia

- Word Processing Difficulties
- Word Retention
- Spelling Issues
- Variable Spelling
- Sequencing ...



Dyslexics

- Are empathetic
- Right brained
- Think in pictures
- Are creative



Dyslexics and Passwords

- Passwords are essentially words – alphanumeric strings
- Creating, remembering, entering passwords becomes problematical
- Spelling is unstable



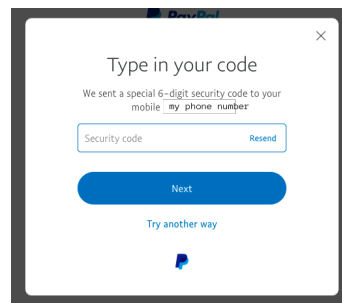
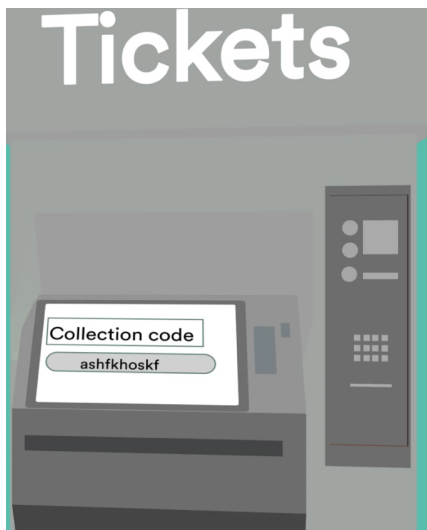
Eg.



- Belladonna might become
 - Bellabonna
 - Delladonna
 - Donabella
 - Beladonia
 - Beilabona



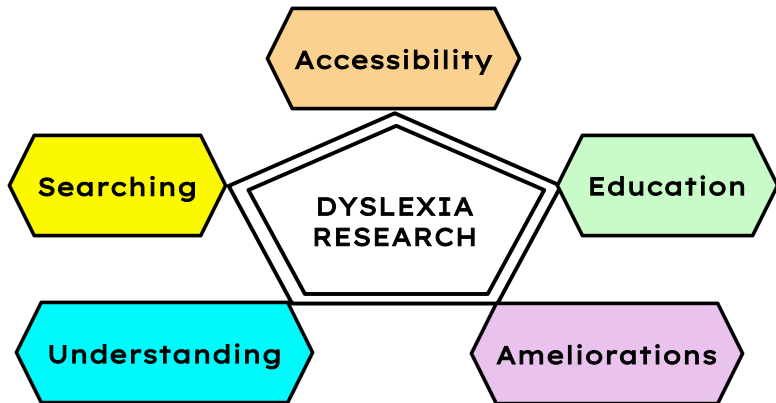
Tickets



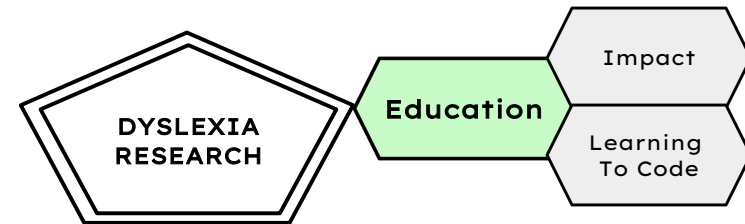
Literature Review

- (“dyslexia” or “dyslexic”) and “passwords”
- Academic Search Premier, SCOPUS, Social Science Citation Index, Science Citation Index, ACM Digital Library, IEEE Xplore, Springer, JSTOR, ProQuest, PsychInfo and ERIC

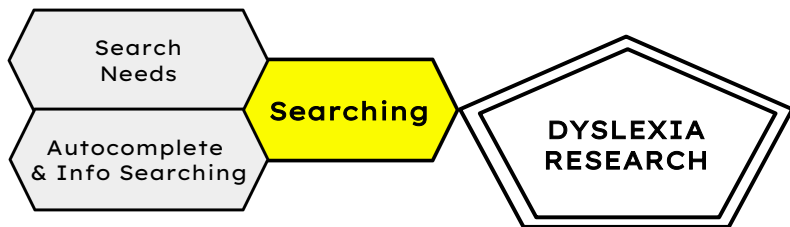
Literature Review



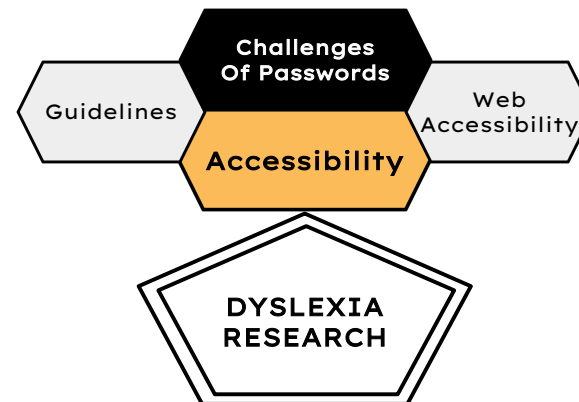
Education



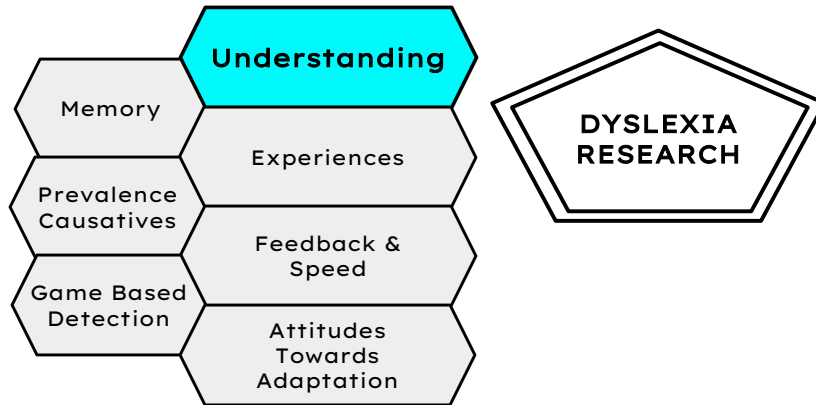
Searching



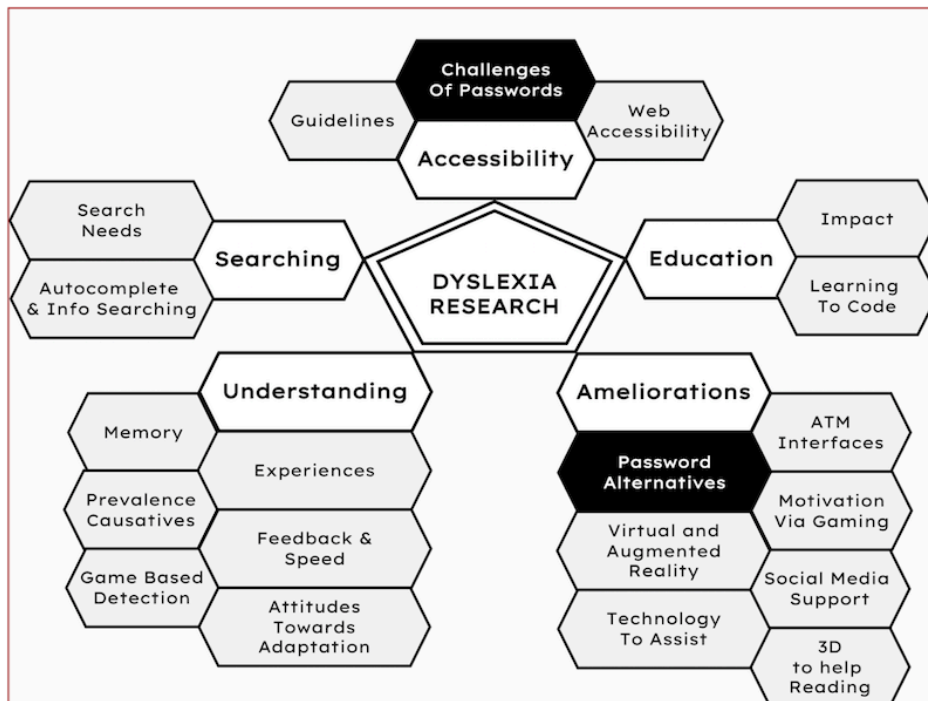
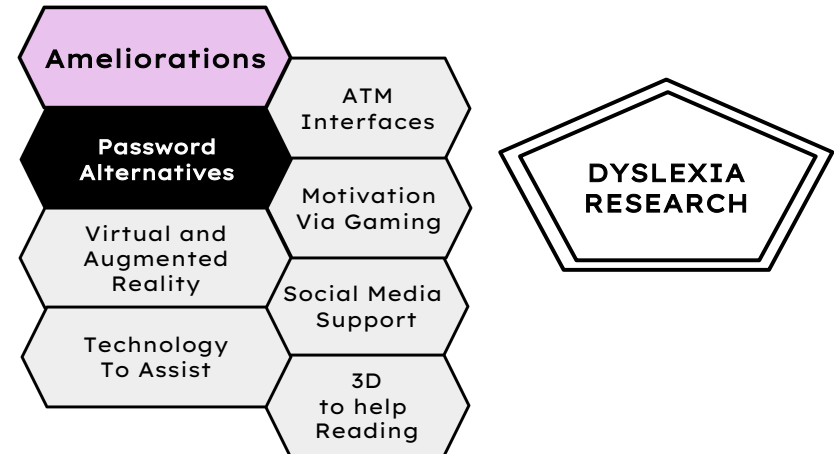
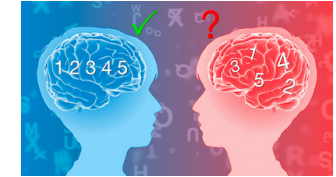
Accessibility



Understanding



Ameliorations



Reflection

- Password strength requirements are problematical
- 2FA with code likely to stump dyslexics
- As we improve authentication strength, we impact accessibility as well as usability



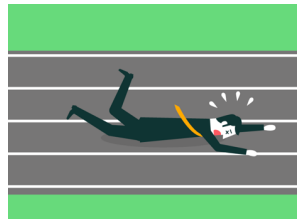
Spafford Said...



- Why do we use the same tool everywhere?
- ... and maximise **Speed of Development** and minimise **Cost**?

We don't think ... hence ubiquitous use of the password

QED



- If authentication is **unusable**, the mechanism is not sound
- If authentication is **inaccessible**, the mechanism breaks the law
- If authentication is **unusable** and **inaccessible**, it **FAILS** as a security mechanism

Spafford Said...



- Look at the overall context
 - Think about what **QUALITY** means
- ... and stop reaching for the ubiquitous password as if it's the best/only tool for the job

Research Directions

- Real-world coping strategies and behaviours
- Password Managers and their adoption
- Accessible multi-factor authentication

Research Directions

- Alternative authentication mechanisms
- Studying dyslexia in the security context
- Ethical research with dyslexics in this space

Conclusion

- Accessibility is a legal requirement - the third dimension
- We cannot ignore the millions of dyslexics who are disadvantaged by password authentication
- We can do better

