

DysWebxia 2.0!

More Accessible Text for People with Dyslexia

Luz Rello

Web Research Group &
NLP Research Group
Universitat Pompeu Fabra
Barcelona, Spain
luzrelo@acm.org

Ricardo Baeza-Yates

Yahoo! Labs Barcelona &
Web Research Group
Universitat Pompeu Fabra
Barcelona, Spain
rbaeza@acm.org

Horacio Saggion

Stefan Bott
Roberto Carlini
NLP Research Group
Universitat Pompeu Fabra
Barcelona, Spain
{horacio.saggion,stefan.
bott,roberto.carlini}@upf.edu

Clara Bayarri
Azuki Górriz

Cookie Cloud
Barcelona, Spain
{clarabayarri,idontcry}
@gmail.com

Saurabh Gupta
Gaurang Kanvinde

Accessible Systems
Mumbai, India
{saurabh.gupta,gaurang}
@accessiblesystems.co.in

Vasile Topac

Information Tech. Depart.
Polytechnic University of
Timisoara, Romania
vasile.topac@aut.upt.ro

ABSTRACT

Even if dyslexia is neurological in origin, certain text modifications could make texts more accessible for people with dyslexia. We introduce *DysWebxia 2.0*, a model that integrates our findings from research conducted with this target group. It alters content and presentation of the text to make it more readable. We also present the current integrations of *DysWebxia* in different reading software applications.

Categories and Subject Descriptors

K.4 [Computers and Society]: Social Issues—*Assistive technologies for persons with disabilities*

Keywords

Dyslexia, text presentation, text explanation, readability, browser plug-in, web service, tablet, smartphone.

1. WHY?

Worldwide, 10% of the population has dyslexia, a cognitive disability affecting reading and writing which has a considerable presence in the Web [1].

Although there are no specifications for this disability in the WCAG, the use of certain text conditions can help people with dyslexia to read text better.

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Even though, the use of complicated language has been extensively pointed out as one of the key problems for this target group, all the existing applications at the moment only alter the design of the text, such as SeeWord,¹ Claro Screen Ruler Suite,² Colour Explorer³ or Penfriend XL,⁴ with SeeWord the only one designed on the basis of qualitative data from studies with people with dyslexia.

Given that dyslexia is a disability that affects language, accessibility can be approached not only from the text presentation, but also from the text content. Hence, we combine form and content in *DysWebxia 2.0*, while the 1.0 version only focused on the form.

2. WHAT?

DysWebxia is a model to make text more accessible to people with dyslexia which combines the following innovative contributions:

- The model is grounded in studies with people with dyslexia that measure the impact on readability and comprehension of different text alteration strategies using eye-tracking.
- This is the first model that integrates automatic text content suggestions [4] and includes text presentation guidelines based on quantitative results [7].
- Although *DysWebxia* was first implemented for reading text on the Web [7], the new model is being adapted for other platforms where there was no similar reading software for people with dyslexia.

¹<http://www.computing.dundee.ac.uk/projects/seeword/>

²<http://www.clarosoftware.com/index.php?cPath=348>.

³<http://colour-explorer.software.informer.com/9.0/>

⁴<http://www.penfriend.biz/pf-xl.html>.

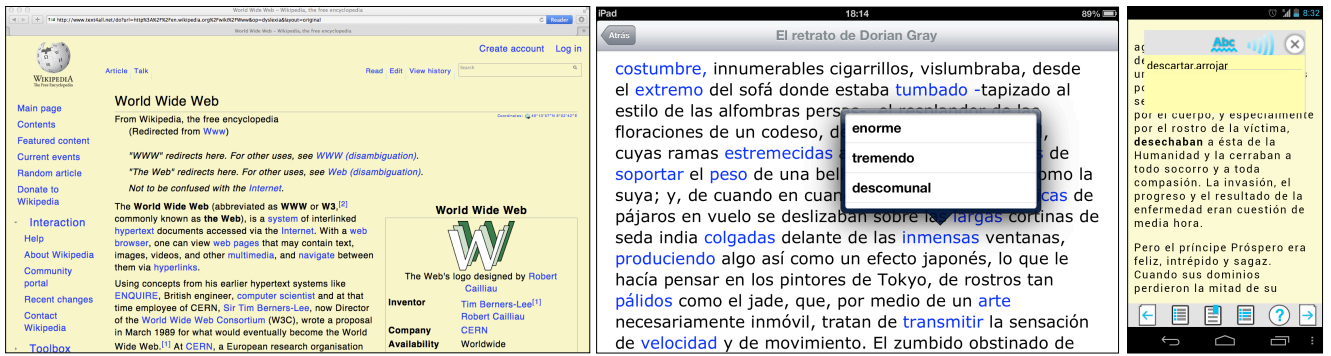


Figure 1: *DysWebxia* for *Text4all* web server (left), for iPad (middle) and for *IDEAL* eBook reader (right).

3. HOW?

DysWebxia is strictly designed along findings from previous research on people with dyslexia. Following, we present the findings that *DysWebxia* integrates and the different software which include the model.

3.1 Research Background

Text Content: Previous findings have shown that people with dyslexia specifically encounter problems with complex language, implying that they may benefit from lexical simplification [5, 2] as well as certain number representation [6]. A study with 47 people with dyslexia, using different devices (laptop, tablet and smartphone), compared different automatic lexical simplification strategies. It showed that people with dyslexia perceived as significantly more readable and comprehensible the text when they can interactively request simpler synonyms for the complex words [4]. Hence, *DysWebxia* integrates an assistive technique where synonyms of complex words are presented on-demand (see Figure 1, middle and right).

Text Presentation: The presentation of the text has a significant effect on the readability and on the comprehension of people with dyslexia [7]. *DysWebxia* includes the text guidelines parameters where this target group reaches the best readability and comprehension, based on two eye-tracking studies with 46 and 36 people with dyslexia, respectively. The first study determines the parameters (font size, colors, spacings, etc.) for reading raw text on a screen [7] and the second study assesses the combination of the parameters in the context of the Web [8].

3.2 Prototypes

DysWebxia has been integrated or is being integrated in the following reading software applications:

- In the *IDEAL eBook reader* for Android⁵ [3] (see Figure 1, right).
- In then *AccessibleNews*⁶ web server for displaying news in a more accessible way [7].
- In the *Text4all*⁷ text customization server for existing web pages [9] (see Figure 1, left).

⁵<https://play.google.com/store/apps/details?id=org.easyaccess.epubreader>

⁶An example can be found at <http://www.accessiblenews.co.in/dyswebxia2/>

⁷<http://www.text4all.net/dyswebxia.html>

- In *DysWebxia* as a reading tool for iOS (see Figure 1, middle).
- In *DysWebxia* as a browser plug-in for a reading tool.⁸

Since there is no universal profile of a user with dyslexia, in all these implementations the text presentation settings are customizable and users can override the settings according to their personal reading preferences.

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⁸A mock-up can be found at http://www.luzrello.com/DysWebxia_mockup/