Funded by the Horizon 2020
Framework Programme of the
European Union

D4.1
Specifications of the user profile

PROJECT DOCUMENTATION SHEET	
Project Acronym	Easy Reading
Project Full Title	Easy Reading
Grant Agreement	780529
Call Identifier	H2020-ICT-2016-2017
Topic	ICT-23-2017
Funding Scheme	RIA (Research and Innovation action)
Project Duration	30 months (January 2018 – Juni 2020)
Project Officer	Michael Busch, European Commission Directorate-General for Comminications Networks, Content and Technology, Unit &-3, L-2557 Luxembourg, +352.4301.38082
Coordinator	Universität Linz (JKU), Austria
Consortium partners	Kompetenznetzwerk (KI-I), Austria Technische Universität Dortmund (TUDO), Germany In der Gemeinde Leben gGmbH (IGL), Germany FUNKA Nu AB (FUNKA), Sweden Texthelp Ltd (TEXTHELP), United Kingdom VÄSTRA GÖTALANDS LÄNS LANDSTING (DART), Sweden GEIE ERCIM (ERCIM), France AHTENA I.C.T. Ltd (ATH), Israel
Website	www. http://www.easyreading.eu

DELIVERABLE DOCUMENTATION SHEET	
Number	Deliverable D4.1
Title	Specifications of the user profile
Related WP	WP4
Related Task	T4.1
Lead Beneficiary	FUNKA Nu AB (FUNKA), Sweden
Author(s)	Linus Ersson
Contributor(s)	
Reviewers	Lisa Seeman
Nature	Report
Dissemination level	Public
Due Date	31.12.2018
Submission date	28.12.2018
Status	final

QUALITY CONTROL ASSESSMENT SHEET			
Issue	Date	Comment	Author
	20.12.2018	Approved	Lisa Seeman (Athena)

DISCLAIMER

The opinion stated in this report reflects the opinion of the authors and not the opinion of the European Commission.

The commercial use of any information contained in this document may require a license from the owner of that information. All Easy Reading consortium members are also committed to publish accurate and up to date information and take the greatest care to do so. However, the Easy Reading consortium members cannot accept liability for any inaccuracies or omissions nor do they accept liability for any direct, indirect, special, consequential or other losses or damages of any kind arising out of the use of this information.

ACKNOWLEDGEMENT

This document is a deliverable of the Easy Reading project, which has received funding from the European Union's Horizon 2020 Programme for Information and Communication Technologies under Grant Agreement (GA) Nb #780529.

Executive Summary

This deliverable gives a short overview of how the user profile can be setup by four main parts; personal information, cognitive impairments, user status recorded by direct time tracking and settings for the interaction concepts and modes. It describes what parts of the profile can be setup and edited by the user and care taker and what parts will be affected by the real time user tracking. It also describes how the profile will influence which tools will be suggested to the user and the settings of these tools.

The present document is a deliverable of the Easy Reading project which is funded by the European Union's Horizon 2020 Programme und Grant Agreement #780529.

Table of Content

Introduction

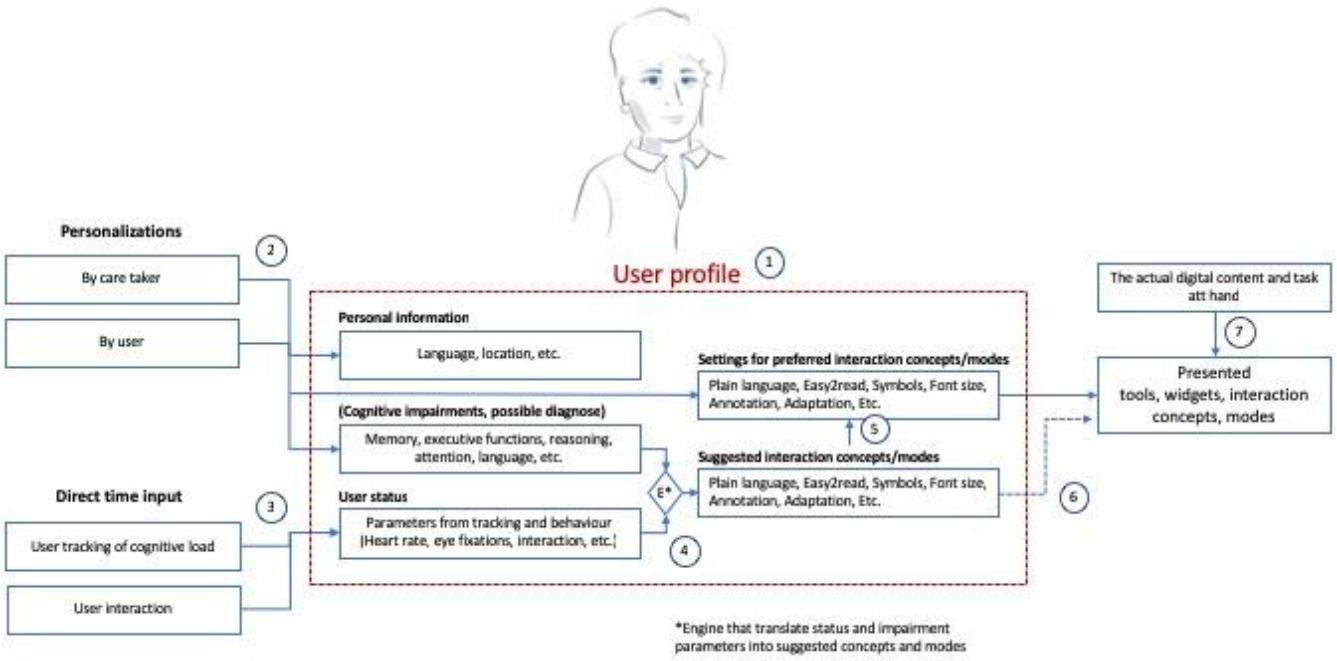
Task 4.1 will focus on structuring and developing the user profiles so that they will be able to take into account factors of actual state of the user (based on tracking), save user preferences and previous history of usage, capabilities, both in cognitive terms and relating to use of computers and web tools, and preferences (Symbols, Easy2Read, Font size). The task will receive feedback from task 4.3,"Profile validation and user testing", in order to refine the profile framework and ensure that it corresponds to the needs of the users.

The outlined tracking of the individual level and approach to understandability is the core source for personalization for cognitive accessibility services. An individual user profile has to make sure that this source gets live updated and is adequate in terms of:

- the actual status (e.g. understanding, attention, mood, stress) of the user.
- the actual digital content and task at focus.
- the actual environmental factors of influence.
- manageable and preferred HCI and interaction concepts.
- manageable and preferred modes of presentation and interaction in terms of annotation, adaptation and translation including motivation and attention generating features.

These levels of influencing factors impact on each other as well as they change over and in real time and need to be updated permanently. In addition, they will interact with the personal set of skills and tools of the user. Users might for example have learned to work with particular levels of easy to read, with specific sets of symbols, pictures, videos, animations or other tools supporting cognitive accessibility. This personal set of skills and tools also needs to be reflected and respected in the system. There is therefore a strong need that users and in particular their care providers have the possibility to influence and shape the profile, in particular when they start to use the framework and develop their individual solution. It is important to define and implement a semantic system, which allows storing and adapting the user profile, which is subject to live adaptations and learning based on tracking user behavior and environmental factors. Relations to alternative content presentations, preferred or usable formats, motivating cues and other aspects have to be represented in the semantic profile. And being aware of the still existing and ongoing limitations of automatic tracking and supported or automatic service provision we support influencing and adapting the behavior of the "Easy Reading" framework: Providing a back-end functionality will allow users themselves and in particular care and service providers to make changes to the profile and add additional alternative content as e.g. personal symbols, pictures, videos. Besides offering a corrective layer for the system, this makes "Easy Reading" a tool controlled by practitioners, a tool respecting and starting from the actual practice and supporting a much more "human" approach to the individual situation. This also guarantees that other aspects of work in the project, in particular the HCI studies and content/interface changing routines are not dependent on having fully working automatic routines as the backend allows also "human made" simulations.

Overview



User profile

The user profile, see image above (1), is setup by four main parts; personal information, cognitive impairments, user status recorded by direct time tracking and settings for the interaction concepts and modes.

Different parameters in the user profile can be changed by either the user/care taker or by direct time tracking and together these will control which interaction concepts and modes of presentation is preferred. This makes some difficulties in determining who of these two instances will have the last saying in controlling which concepts and modes will be presented when the user is navigating the web with the Easy reading framework activated. The framework will suggest concepts and modes based on tracking, but the users should also be able to choose which ones they want to use. Therefore, the profile should contain both preferred concepts and modes setup by the user and by the framework suggested concepts and modes.

In this way the user and/or care taker can setup and change personal information, possibly cognitive impairments/diagnose and choose which interaction concepts and modes of presentation to use and edit their settings. (2)

User interaction and tracking of cognitive load is recorded into parameters of the user status also within the user profile. (3) These recorded parameters together with parameters of cognitive impairment is used by the framework engine to calculate suggestions of interaction concepts and modes of presentation. (4).

The user can either when editing the profile (5) or in direct time (6) choose to accept suggested concepts and modes.

The final presented concepts and modes will in this way depend which ones is preferred and suggested but also the actual digital content and task at hand. (7)

Four main parts of the user profile

1. Personal information

Since the user will login to Easy Reading with Google the framework won't need to store any user information required to login. If the user wants to change user name or password it will be done in the google interface. Of security reasons the aim is not to save any information that could identify the user, so the framework won't store name, gender, age etc. In this way the framework can be relatively open, easily accessible and need no other secure login than a google account.

The only personal information editable by the user in the Easy Reading framework will be information that is of interest of the framework itself and the use of it. This could be;

- Language for the Easy Reading User interface
- Location in the case that location could control which concepts /modes to choose from.

2. Cognitive impairments (Diagnose)

It might not be necessary to store cognitive impairments and especially not diagnose in the profile but if the framework should be able to suggest interaction concepts and modes of interaction based on information given by the user or care taker it needs relevant parameters given by the user.

In this case it can be hard to decide which information to store. There are numerous amounts of diagnoses which include cognitive impairments and different users have different impairments even within the same diagnose. A solution can be to instead focus on the specific impairments.

W3C has summarized a list if areas people with cognitive disabilities may have problems in (Cognitive Accessibility User Research, W3C Editor's Draft 06 December 2018). These areas can be included for in the profile to make it possible for the user and/or care taker to specify areas where the user might have problems. Each area could be set either by a simple yes or no or with a scale, for instance 1-5, to grade the approximate severity of each problem.

The W3c areas and suggested parameters are;

- **Memory** - Including: Working Memory, Short-Term Memory, Long-Term Memory, Visual Memory, Visuo-spatial Memory, Auditory Memory (memory for sound patterns and others).
- **Executive Functions** - Including: Emotional Control and Self-Monitoring; Planning/Organization and Execution; and Judgment.
- **Reasoning** - Including: Fluid Reasoning (logical reasoning), Mathematical Intelligence, Seriation, Crystallized Intelligence, and Abstraction.
- **Attention** - Including: Selective Attention, and Sustained Attention.
- **Language** - Including: Speech Perception, Auditory Discrimination, Naming Skills, and Morphosyntax.
- **Understanding Figurative Language** - Including: similes, personification, oxymorons, idioms, and puns.

- **Literacy** - Depends upon functions including: Speech Perception, Visual Perception, Phoneme Processing, and Cross-Modal Association (association of sign and concept).
- **Other Perception** - Including: Motor Perception, Psychomotor Perception.
- **Knowledge** - Including: Cultural Knowledge, Jargon (subject matter); Web Jargon and Technology; Metaphors and Idioms; Symbols Knowledge (such as icons); and Mathematical Knowledge.
- **Behavioral** - Including: Understanding Social Cues.

There is a problem with identifying cognitive functional impairments as it identifies issues of user vulnerability. We may therefore use functional preferences that are implied by functional impairments but may be true of many other groups as well. Examples include:

Unable to understanding Figurative Language maps to **Prefer literal language**

- The user may prefer literal language because of a learning disability OR because of cultural background

Language impairments maps to **Vocabulary of 1500 words in English**

- The user may prefer literal language because of a learning disability OR because English is a second language

Reduced working memory maps to **multitasking mode**

- The user may not be able to use more than two items from their memory at the same time because of a learning disability OR because they are multitasking

This approach also make the profile useful to people who do not identify as learning disabled or cognitively impaired which may help adoption.

3. User status

User status is parameters that is recorded by tracking of cognitive load and by storing the user interaction with the browser.

User tracking of cognitive load

The data the profile can store from user tracking is dependent of the technologies chosen for tracking (WP3) but can for instance include;

- Heart rate
- HRV (Heart rate variability)
- Parameters of electro dermal activity
- SPO2
- Skin temperature
- Facial expressions
- Eye tracking
    - Fixations
    - Saccades
    - Blink rate
    - Pupil dilation

Tracking user interaction

Data from recording how the user interacts with the interface, the browser and web page might include;

- Click times
- Movement of mouse pointer
- Times spent at a certain page or task.
- Going back and forth in pages
- Performing task, the wrong way

4. Settings for interaction concepts and modes of presentation

The profile should contain two lists of interaction concepts and modes of presentation. One containing the concepts and modes which is chosen by the user and which the user can edit, and the other a list of concepts and mode suggested by the framework based on tracking and the cognitive impairments.

W3C lists examples of the personalized help and support properties in the following document; W3cPersonalization Help and Support 1.0, W3C Editor's Draft 17 October 2018. This list of properties may be used to store concepts and modes.

Both lists will include the same concept modes, and these could be;

Interaction concepts.

- Plain language
- Easy2read
- Symbols
- Font size
- Change background color
- Language up to 1000 words (vocab1000), (W3C)
- Fewer choices (lessOptions), (W3C)

Modes of presentation

- Annotation
- Adaptation

Each concept/mode also has a number of individual settings, but these settings are probably set by the user/care taker. That is there is probably no need for the system to suggest specific concept/mode settings.

Individual settings could be;

- Specific background colors
- Font sizes

Conclusions

This report introduces the categories that will be maintained in the user profiling, and how they will be harmonized with existing standards. It should be noted that this is an initial draft and changes are anticipated as the project progresses.