Living Labs and Open Toolkit for the co-design of accessible IT systems and tools

PROJECT

Living Labs and Open Toolkit for the co-design of accessible IT systems and tools

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EXECUTIVE SUMMARY

Deliverable 1.2 - Baseline Catalogue - is an output of Work Package 1 – Baseline Mapping. The baseline Catalogue of resources to support inclusive web accessibility is intended to, firstly, feed into the elaboration of the user needs analysis and technical specification for designing and implementing LIVE IT's 'Co-design Labs (Co-Labs) and, secondly, to lay the foundations for an evolving resource of examples of good practices for supporting the digital inclusion of people with cognitive disabilities that forms part of the LIVE IT 'Open Toolkit'. The Catalogue was produced within the first six months of the project and comprises a repository of 161 items of good practices and web accessibility interventions'- including examples of platforms and tools - that have the potential to support inclusive web accessibility. of good practices and web accessibility interventions'- including examples of platforms and tools - that have the potential to support inclusive web accessibility. These will be reviewed and assessed, to be then experimented with in WP3 and 4 in the co-lab settings.

1 INTRODUCTION

1.1 PURPOSE AND SCOPE

The aim of this document is to describe The Baseline Catalogue which lives within Work Package 1 – Baseline Mapping. WP1's objectives are:

- To review the state of the art in the field of inclusive web accessibility and identify drivers and barriers that constrain and support access for people with cognitive disabilities
- To conduct an 'interventions audit' of 'what works, for whom and in what circumstances', focusing on innovative interventions to support inclusive web accessibility.
- To identify and benchmark the most promising platforms and tools that could potentially support inclusive web accessibility.
- To develop and implement a tool to assess the effectiveness and replication potential of these platforms and tools.
- To produce a baseline Catalogue of resources to support inclusive web accessibility.

The main outcome of WP1 - the production of a baseline Catalogue of resources supporting inclusive web accessibility – incorporates the results of tasks 1.2, 1.3 and 1.4 of WP1.

Task 1.2: Initiatives review - collected, collated and analysed examples of good practices and web accessibility interventions'- including examples of platforms and tools - that have the potential to support inclusive web accessibility. This task followed a review method performed in Task 1.1. – outlined below in Section 2 of this Deliverable - which also identified strategies, platforms and tools to improve web accessibility of people with cognitive disabilities. This review included but was not limited to research on existing databases of examples of innovative policies and interventions such as databases at EU level (e.g., FP7; H2020; Erasmus) and national level. Task 1.3 - 'Best of breed' platforms and tools - reviewed the list of initiatives produced in Task 1.2 to identify the platforms, tools and practices most amenable to addressing the needs and lived

experience of people with cognitive impairments. Task 1.4 - Effectiveness analysis **–** applied an 'evidence effectiveness and replication' methodology and tool to assess how likely the best of breed platforms and tools identified in Task 1.3 are to deliver the most effective results in supporting inclusive web accessibility.

1.2 INTENDED AUDIENCE

This document should be used as a reference by:

- all Consortium Partners of LIVE IT
- LIVE IT network of stakeholders
- Organisations working with PwCD
- PwCD and carers-families

1.3 STRUCTURE OF THE DELIVERABLE

The following deliverable is organised in 5 sections:

Section 1 Introduction: here a brief context and explanation of the background and purposes of the deliverable is provided

Section 2 Methodology: a brief explanation on the methodology that guided the production of the Baseline Catalogue is provided

Section 3 Results: describes the initial results of the repository and the following steps of Benchmarking and Evidence Effectiveness analysis.

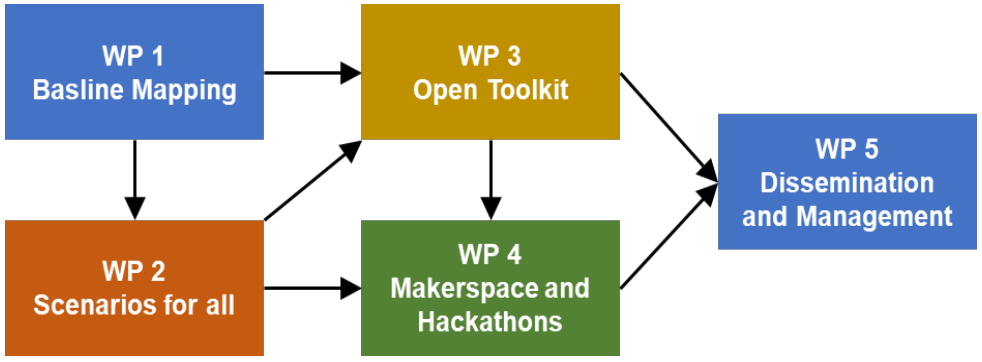
Section 4 Developer and web-design challenges and recommendations: provides a set of suggestions generated by the LIVE IT results and findings

Section 5 Conclusion and Further Discussion: provides concluding remarks and comments for further discussion around the Baseline Catalogue.

1.4 RELATION TO OTHER WPS & TASKS

The relation of the Baseline Catalogue to the other WPs and tasks is shown in the Figure below. As the Figure shows, Task 1.2 is part of the initial 'baseline mapping' activities that form a suite of research work aimed at preparing the ground for the subsequent development of the LIVE IT Co-Labs in work package 2. The Co-Labs experiment with 'scenarios for all' that configure digital platforms, tools and practices aimed at increasing digital inclusion for people with cognitive disabilities. These experiments then feed into the production of an 'Open Toolkit' in work package 3 that is further refined and improved through validation and evaluation work carried out by the LIVE IT Online Community and Makerspace.

Figure 1 Relationship between Task 1.2, other WP1 tasks and other LIVE IT work packages



2 METHODOLOGY

2.1 IMPLEMENTATION OF THE METHODOLOGY

Based on the task 1.2 – Initiatives review, a guideline was produced to search databases and collect data as a procedure for partners to collect, collate and analyse examples of good practices – 'interventions'- including examples of platforms and tools - that have the potential to support inclusive web accessibility.

The primary aim was for each partner to do online searches (using online search engines and databases) and collect relevant practices to produce a preliminary longlist of examples of 'good practice' cases of interventions. This was the initial step in the overall goal of developing the LIVE IT Baseline Catalogue. This search produced a list of 161 potential items in support of inclusive web accessibility (the target was to collect over 100 initiatives).

The second stage of developing the Baseline Catalogue, entailed selecting 50 of these items, benchmarking and then scoring them on 'evidence effectiveness' in tasks 1.3 and 1.4.

2.1.1 STEP 1 – Items search

The main objective of this task was to collect over 100 initiatives addressing accessibility challenges people with cognitive disabilities face in the digital world. A set of criteria was then established that the search needed to consider:

1. Presenting challenges of people with cognitive disabilities face in the digital world
2. Tools and Techniques that help to deal with the web accessibility challenges people with cognitive disabilities face
3. Relevance of the Tool for the 4 Co-LABS
4. Type of Cognitive disability. Although the specific cognitive disability is important to consider helping in diversifying search strings, it was not considered a primary criteria: LIVE IT's primary strategy is to reflect on the challenges people with cognitive

disabilities will face in the digital world, which will be then further explored in the LAB scenarios.

2.1.1.1 Presenting challenges of people with cognitive disabilities face in the digital world

People with cognitive disabilities often present one or several of the following problems and challenges:

Table 1 Cognitive function and challenges

Cognitive Function (which problems of cognitive function the resource is addressing)	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. Behavioural - Including: Understanding Social Cues.[1]

These cognitive challenges in turn reflect a range of **digital (or 'accessibility') challenges** that people with cognitive disabilities have to overcome. These include:

-signing in or completing authentication processes;

- entering data or filling out forms, avoiding and correcting errors;

- accomplishing multi-stage tasks;

- using complex interfaces and intricate navigation patterns;

- processing information on cluttered pages, avoiding cognitive overload;

- getting focussed on the task at hand, limiting interruptions, reminders, and changes in content;

- stopping animations and auto-play videos or audios;

- understanding text and graphics;
- identifying key points from lengthy or heavy text-based pages;
- interpreting and processing numerical information, including managing dates;
- finding information;
- following instructions;
- looking for help or support

2.1.1.2 Tools and Techniques that help to deal with the web accessibility challenges people with cognitive disabilities face

There are a number of tools and techniques to address some of the challenges people with cognitive disabilities:

Table 2 Types of Tools and Techniques

Types of Tools and Techniques the resource is addressing and how is solving the previously identified problem	1) perception: hearing, feeling and seeing (e.g., refreshable braille display, screen reader, voice browser, etc.) 2) Presentation distinguishing and understanding (e.g., pop-up and animation blockers, reading assistants, screen magnifier, volume control, etc.) 3) Input typing, writing, and clicking (e.g., accelerators, alternative keyboard and mouse, eye tracking, keyboard customization, on-screen keyboard, voice recognition, word prediction, etc) 4) Interaction navigating and finding (e.g., bookmarks and history, keyword search, page maps, etc)[2]

2.1.1.3 Relevance of the Tool for the 4 Co-LABS

The four LIVE IT Co-Labs provide spaces for teams of people with cognitive disabilities working in collaboration with experts and designers to explore and build on available platforms and tools to re-frame and reconfigure them to their needs. The co-Labs are supported by an online ***'makerspace'*** in which people with cognitive disabilities can experiment with promising digital tools in a real-time virtual laboratory that can identify what works and what doesn't. Whilst each of the four Labs in the four partner countries share common design and implementation themes, each has a distinct thematic focus, as shown in Table 3.

Table 3: The four Co-Lab themes

Lab Type	Focus
Life Skills Lab (Portugal)	Focuses on navigating and managing interactions with 'the system', including consumer transactions and related issues such as understanding contracts and small print; filling in forms; consumer rights; online security and protection; managing dates and appointments
Emergencies Lab (UK)	Focuses on reducing risk and increasing preparedness and resilience in emergency situations – both at the everyday level, for example health e-consulting, and at the large scale, such as the COVID pandemic – covering finding information, looking for help and support, understanding emergency procedures and instructions
Self -Development Lab (Ireland)	Focuses on supporting people to take advantage of the opportunities provided by digital technologies for learning, employment, personal development, involving navigation, information searching, information processing, understanding text and graphics and using animations, working with authoring systems

Help & Support Lab (Greece)	Focuses on using online information and guidance systems, for example searching for and using public information tools, using complex interfaces and gateways, identifying key points from dense and 'official' documentation, navigating through guidelines

While performing the searches a set of keywords (search terms) needed to be produced, so that the returns produced deliver the most relevant items for each partners' LAB, covering the possible challenges while performing tasks within the scenarios to be addressed. Each of the LAB's partner was invited to reflect on their themed challenges and perform searches for tools that would best serve these themed challenges:

Table 4 LAB and themed challenges

LAB	Themed Challenges
LIFE SKILLS LAB: Focuses on navigating and managing interactions with 'the system'	consumer transactions understanding contracts and small print; filling in forms; consumer rights; online security and protection; managing dates and appointments
EMERGENCY LAB: Focuses on reducing risk and increasing preparedness and resilience in emergency situations	health e-consulting COVID19 finding information, looking for help and support understanding emergency procedures and instructions

SELF -DEVELOPMENT LAB: Focuses on supporting people to take advantage of the opportunities provided by digital technologies for learning, employment, personal development	navigation, information searching, information processing, understanding text and graphics and using animations, working with authoring systems
HELP & SUPPORT LAB: Focuses on using online information and guidance systems	searching for and using public information tools using complex interfaces and gateways identifying key points from dense and 'official' documentation, navigating through guidelines

Example:

A search for the Life Skills Lab, would be produced by combining general search terms with lab specific terms such as "web accessibility"+"online banking" or "dyslexia"+"e-commerce" or "accessible online payment methods"

2.1.1.4 Type of Cognitive disability

The specific cognitive disability was important to consider and helped to diversify search strings, however it was also important to note that the LIVE IT primary strategy was to reflect on the above-mentioned challenges people with cognitive disabilities will face in the digital world, which will be then further explored in the LAB scenarios.

2.1.1.4.1 Target groups to be covered in the search

The list of items aiming at inclusive web accessibility targeting people with cognitive disabilities include a variety of type of cognitive disability. Other target groups include not just people with cognitive disabilities using digital products, but everyone involved in creating products and services, such as:

Table 5 Target Groups

Cognitive Disability	Other target groups include
Dyslexia; Aphasia; Non-verbal - Severe Speech and Language impairments; Aging-Related Cognitive Decline and Dementia; Down Syndrome; ADHD; Autism; Dyscalculia; Learning Disability; Intellectual Disability; Cerebral Palsy; Brain Injury; Motor neurone disease; Irlen Syndrome; Pervasive Developmental Disorder	Web developers; Designers; Coders and programmers; Content Producer (including user generated content of Social Media, Blogs, Journals, etc); Business (owners); Governments; NGOs

An example of a procedure was to start with a matrix of three broad keyword groups, broken down by specific keywords in each group, as shown in Table 5. Note this was for illustrative purposes, it was up to each partner to decide on their own keyword matrix.

Table 3 Example of Keyword matrix

General keyword group	**Specific keywords**
Web accessibility	Web Accessibility, Digital, ICT, Internet, Digital Inclusion
Cognitive disability	Dyslexia, Aphasia, Non-verbal, Dysarthria; Dyspraxia; Dementia; Alzheimer's disease; Intellectual Disability; Attention deficit hyperactivity disorder (ADHD); Autism; Asperger syndrome; Dyscalculia; Downs syndrome; Motor Neurone Disease; Brain injury; Stroke; Cerebral palsy
Type item and/or issue	Policy, Guidelines, E-Health, E-Commerce; E-Service; E-Banking; Social Media, Distance Learning; Online Safety

Partners were invited to use search terms (keywords) that will enable identification of **examples of good practices – 'interventions'- including examples of platforms and tools** that have the potential to support inclusive web accessibility.

Inclusion-exclusion criteria

The inclusion criteria are the elements of an item that ***must be present*** if that item is to be included in the output of a review, in the LIVE IT case, the output is the Baseline Catalogue of promising platforms, tools and practices. The exclusion criteria are those elements of an item that ***disqualify*** the item from being included in the output. In the 'realist' review performed in the LIVE IT apply flexible criteria reflecting the context and variability of the domain, but at the same time embedding objectivity and rigor in the results by using inclusion-exclusion criteria to define the domain boundaries.

The main principle that has shaped the definition of inclusion-exclusion criteria set out for task 1.2 were the overall objectives of WP1 LIVE IT:

- Review the state of the art in the field of inclusive web accessibility and identify drivers and barriers that constrain and support access for people with cognitive disabilities
- Conduct an 'interventions audit' of 'what works, for whom and in what circumstances', focusing on innovative interventions to support inclusive web accessibility.
- Identify and benchmark the most promising platforms and tools that could potentially support inclusive web accessibility.
- Develop and implement a tool to assess the effectiveness and replication potential of these platforms and tools.
- Produce a baseline Catalogue of resources to support inclusive web accessibility

These main objectives lead to the following results:

D.1.1 State of the Art and Audit: Report on drivers and barriers identifies key constraints against online accessibility for people with cognitive disabilities.

D1.2: Baseline Catalogue of promising platforms, tools and practices that will be experimented with in WP3 and 4.

This overall purpose poses a number of additional questions:

- What is web accessibility?
- What kinds of good practices need to be covered in the Catalogue? What are the presenting challenges and issues?
- What are the relevant tools for the 4 LAB Scenarios Design and Testing?
- What are the target groups?
- What is the LIVE IT Baseline Catalogue for? What will be the uses of the catalogue and for who?

Table 6 presents the inclusion-exclusion criteria proposed to help in building the longlist.

Table 4 Proposed inclusion-exclusion criteria

Inclusion criteria – elements the item **must have** to be included in the longlist	**Exclusion criteria –** elements that **disqualify** the item from being included in the longlist
Domain relevance – the item focuses on web accessibility	The item focuses on the use of digital tools to support other issues and not specifically web accessibility
Type of item – the item is an initiative in support of inclusive web accessibility. These include Tools, Evaluation Tools and Web Authoring Tools	The item is not an initiative in support of inclusive web accessibility

The item addresses one or more challenges people with cognitive disabilities face in the digital world	The item does not address any challenge of web accessibility of people with cognitive disabilities
The item needs to be relevant to one of the four co-LABS or for the understanding of the State of the Art of the Web accessibility of people with cognitive disabilities	The item cannot be used in any of the LABS and is not relevant for the State of the Art of the Web accessibility of people with cognitive disabilities
Target groups – the item covers one or more of the target groups: people with cognitive disabilities; Web developers; Designers; Coders and programmers; Content Producer (including user generated content of Social Media, Blogs, Journals, etc); Business (owners); Governments; NGOs	The practice does not cover any of specified target groups (for instance, other types of disabilities)
Outcomes – the item has to have been piloted or implemented, and therefore presenting results.	No results are provided; the results do not show any benefits; no transferable learning can be derived from the practice; the practice cannot be classified as a 'promising' practice even if no results are provided
Recency – the item was published or started after 2011;	The item was published or started before 2010

2.1.2 STEP 2: Fill in the cases you collect in the repository as explained below.

The items collected were uploaded to the LIVE IT Baseline Catalogue form. Each item was described in the Repository using the list of key descriptors, agreed between partners.
In the next phase each case uploaded will have to be validated and will follow a process of data appraisal by their relevance and suitability for the LIVE IT Baseline Catalogue. Once this is done, 50 cases will be selected and will be benchmarked and scored on 'evidence effectiveness' in tasks 1.3 and 1.4.

In general, partners covered 2 types of items:

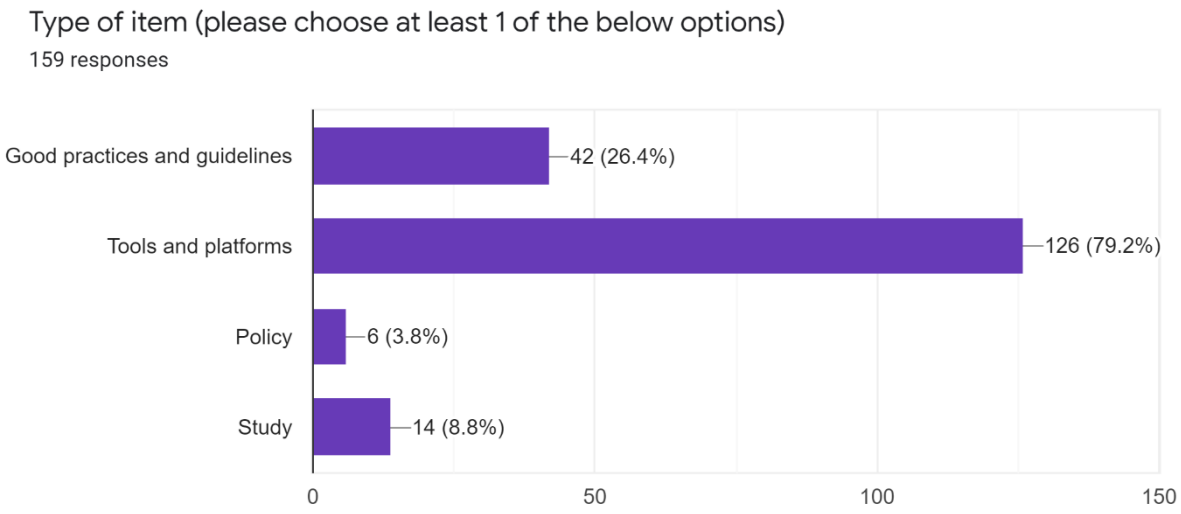
1. Good practices and guidelines listing recommended methods and techniques to tackle known web accessibility challenges
2. Tools and platforms: actual tools and platforms that will be tested based on the type of LABs and specific challenges addressed, and which apply at least some of the guidelines referred in 1.

The data collection system can be accessed through a google form link.
The information was stored via google forms and the data is provided as a spreadsheet. In this spreadsheet, the column *Edit Form URL's* provides a link to be used on the second stage of the process of expansion of each of the shortlisted cases.

3 RESULTS - THE INITIAL REPOSITORY AND LIST OF TOOLS

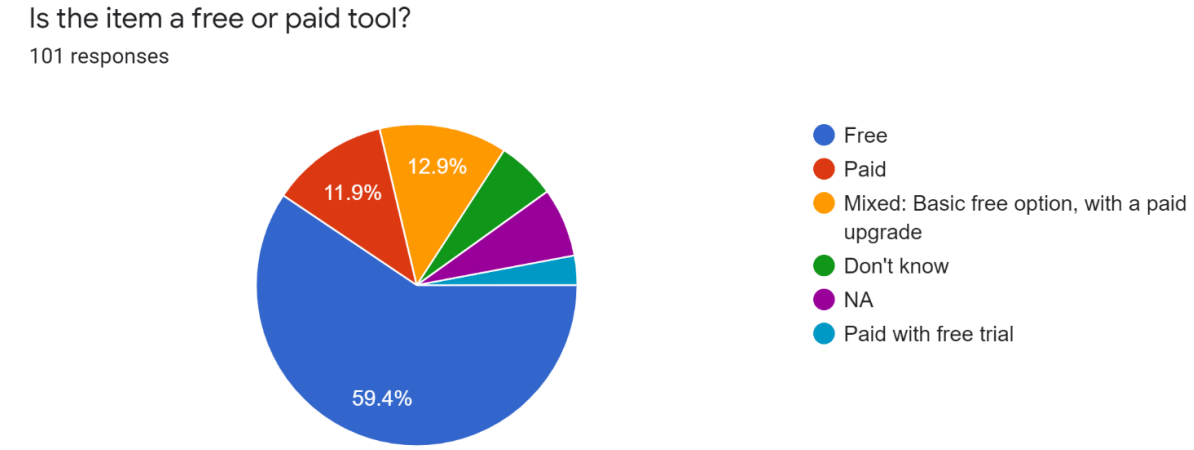
Currently the repository contains 161 resources, these are mainly tools and platforms but also include good practices, studies and policies as it is shown in the figure 2 below:

Figure 2 Type of item



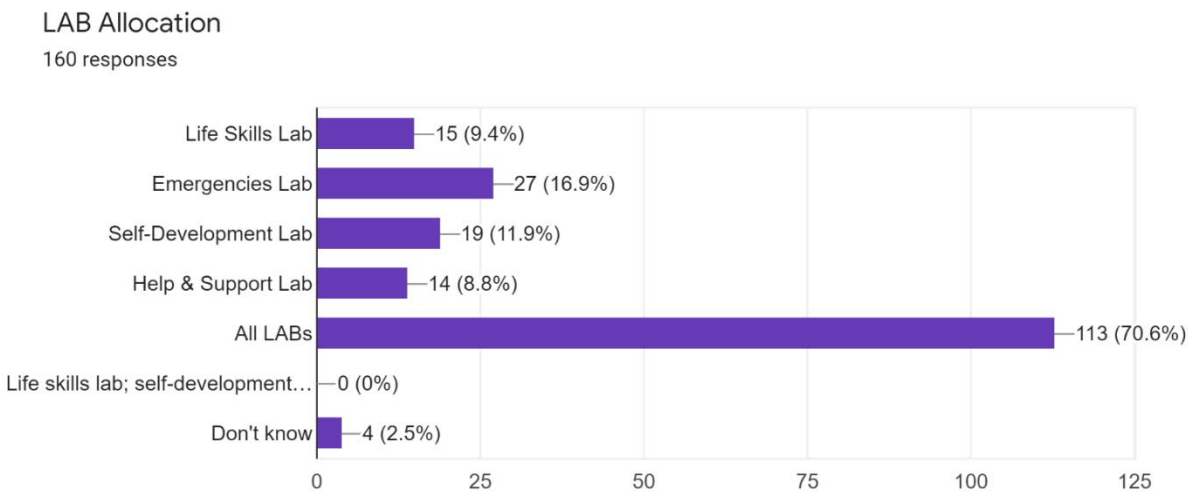
Most of the tools are free and therefore accessible to all as we can see from figure 3 below:

Figure 3 Free or Paid items



And relevant across the 4 co-labs' themes:

Figure 4 lab allocation



From this baseline repository a list of 66 tools was extracted that is serving as a baseline of list of tools which can be used across the 4 lab implementation settings.

3.1 BENCHMARKING AND SELECTION OF PRACTICES

In the framework of Task 1.3: "'Best of breed' platforms and tools" a list of tools selected by the working group was evaluated. These tools are designed and developed as either a direct assistant to accessibility purposes, offering help to PwCD, such as visual enhancement tools (change of font size or setting high contrast to text for example), or indirectly by evaluating the compliance with the accessibility framework level of existing tools, providing valuable feedback on web developers and digital content designers, facilitating a move towards a more "universal design" digital world. The movement towards this "universal design", is the effort of creating an

“as inclusive as possible” digital world, a digital world accessible to everyone regardless his / her impairments or difficulties.

Keeping in mind key indicators that reflect to the efficiency, usability, enjoyability and efficacy of each tool on one side and conformation degree with W3C framework on the other, we assessed the following tools:

1. DysWebexia 2.0
2. WebHelpDyslexia
3. Voiceover
4. Android Accessibility Scanner
5. MS Visual keyboard
6. MS Screen magnifier
7. MS Screen reader
8. MS Speech recognition
9. MS Immersive Reader
10. NVDA
11. Access Angel
12. Be My Eyes
13. TextHelp
14. ReachDeck
15. Read&Write
16. Snap and Read
17. Natural Readers
18. Babbage
19. Switch Access for Android
20. ReadEZ Virtual Overlay Software

21. Lucidspark Mindmapping Software
22. Verbose Text to Speech Software
23. Read Aloud: A Text to Speech Voice Reader
24. Awesome Highlighter
25. Grid 3
26. Dolphin
27. Asana: Your Work Manager
28. Key2enable
29. ClaroRead Windows
30. Dragon Speech Recognition Software
31. Alexa
32. Liquid Mode
33. MindManager
34. Widgit
35. SpeechTexter
36. Apple Voice Control
37. Apple Switch Control
38. Apple Assistive Touch
39. Apple Touch Accomodations
40. Apple Back Tap
41. Apple Siri
42. Apple Accessibility Keyboard
43. Apple Hardware Keyboard Support
44. Apple Dictation
45. Apple Predictive Text
46. Apple Notes
47. Apple Voice Memos App

48. AutoCorrect Windows 10
49. AutoHotKey Microsoft Windows
50. Live Transcribe & Sound Notifications
51. Helperbird
52. Zoom Text and Fusion
53. Assistive Touch for Android
54. Google Calendar
55. Google Chrome
56. Google Assistant
57. Google Keep
58. Gmail
59. Text from to Speech
60. IFTTT
61. AYOA Mindmap
62. Ghostery Browser extension
63. Grammarly
64. IDEAL Group Reader
65. 101 Online
66. Contact the Police
67. When to call 999
68. GP online services

Methodology, benchmarking and referrals to W3C Framework

The inclusion of each tool is based on its significant utility on web accessibility by people with cognitive, neurological and neurodevelopmental disorders and impairments. In the benchmarking process, the team set indicators described previously and the degree on which the tools meet the

goals set by them. W3C compliance is also used as a benchmark and there are references in the framework developed by The Cognitive and Learning Disabilities Accessibility Task Force of the World Wide Web Consortium **Link** (hereinafter "W3C framework") for further value validation - Annex I.

3.2 TASK 1.4: EFFECTIVENESS ANALYSIS

This Task has developed an 'evidence effectiveness and replication' methodology and tool to assess how likely the best of breed platforms and tools identified in Task 1.3 are to deliver the most effective results in supporting inclusive web accessibility. We know from previous research that across Europe the digital inclusion field does not have a strong evaluation culture: "There does not appear to be a high degree of alignment between the 'vision', purposes and orientation of initiatives and the 'evaluation paradigm' adopted [..]. Material on 'what works, for whom, and under which conditions' is scarce." (Cullen, J (2015). Final report on I_C_T_-_enabled social innovation services for the active inclusion of young people. Seville: JRC- _IPTS, pages 31 and 32). This problem is particularly acute in the field of digital inclusion for people with cognitive disabilities, since developing the right kinds of platforms and tools in the LIVE IT Co-Labs to support their digital inclusion – and subsequently producing an 'Open Toolkit' which provides platforms, tools and practices that can be adapted for use in different contexts - requires evidence of 'what works, for whom under which circumstances'. Building on previous work developed by the forerunner project to LIVE IT, project MEDICI (**Link**) the evidence effectiveness methodology and tool assesses two key elements of a digital inclusion good practice – be it a platform, tool or other intervention: first the robustness of the evaluation evidence and, secondly, the potential of the good practice to be scaled up and/or out (its 'replicability'). On

the basis of this assessment a good practice can be classified into one of three categories, as shown in Table 7.

Table 7: Categorisation of digital inclusion good practices on evidence effectiveness and replicability

Category	Defining Characteristics	Evidence effectiveness	Replicability
1. Innovative	Recently developed and not yet established Shows high level of innovation and 'promise'	Little or no evaluation evidence available on outcomes – but evaluation design has been produced	No evidence as yet of scaling up or out Likely to have a positive impact if replicated elsewhere
2. Effective	Intervention already established and has shown a positive effect	One or more evaluations have been carried out using appropriate methods that support confident conclusions	The evaluation evidence supports the replication of the intervention elsewhere
3. Replicable	Well-established intervention	At least two evaluations have been carried out	The intervention has been implemented in

		using appropriate methods that support confident conclusions	more than one location The intervention has been scaled up or there is strong evidence of its scalability

As Table 7 shows, LIVE IT interventions in the baseline Catalogue can be classified into three categories:

- innovative/emerging initiatives (evaluation evidence is limited but the intervention shows potential)
- effective (evaluation has shown the intervention is followed by positive change in relevant outcomes)
- replicable, (outcomes can be confidently attributed to the intervention and the intervention has been rigorously and independently evaluated at least twice.

4 DEVELOPER AND WEB-DESIGN CHALLENGES AND RECOMMENDATIONS

The most useful aspects of the LIVE IT project for designers and developers are likely the websites housing all of the hackathon (end-users) presentations, the catalogue of relevant studies, papers, guidelines and other useful resources on creating accessible contents and the developers' tools found in the Advisor tool of the Open Toolkit. The hackathon presentations include the dreams, recommendations, and proposed web accessibility solutions developed by people with cognitive disabilities. This website was created by one of the UK co-lab and hackathons' participants, Julia. To view the hackathon presentations, follow this link. The catalogue of valuable useful resources can be found under the LIVE IT Open Toolkit Catalogue tab, found in this link.

4.1 CATALOGUE RESOURCES

The latter link directs to the Open Toolkit of the LIVE IT project, which includes the Catalogue tab. There, a list of resources is presented relevant to creating accessible content: 46 studies, 9 guidelines, 8 policies, 44 grey literature and 206 other useful resources documents (consisting of 10 COVID-19, 10 policy-related, 14 studies, 28 studies on specific tools, 31 guidelines, 26 good practices, 15 PwCD focusing, 23 developers and content designer / creators focusing, 22 experts and researchers focusing and 27 educators and caregivers focusing documents). Furtherly, additional resources were added to the existing ones to the Open Toolkit Catalogue during the post-project period, which are more developers' and designers' focused resources and can be categorised and presented as follows:

Subcategory: Creating Accessible PDFs

Theme: Adobe / Target Population: Designers and developers

Link to an Adobe resource , Link to a "Knowledge Base" resource , Link to a "Highline" resource , Link to a YouTube resource , Link to a YouTube resource

Theme: Word / Target Population: Designers and developers

Link to a Microsoft resource , Link to a "Framingham" resource , Link to a Microsoft resource ,
Link to a Webaim resource , Link to a YouTube resource , Link to a YouTube resource

Theme: Google / Target Population: Designers and developers

Link to a Google support resource , Link to a Michigan Tech resource ,
Link to a Michigan State University resource , Link to a YouTube resource

Theme: Tables & Excel / Target Population: Designers and developers

Link to a W3 resource , Link to a Mozilla developers' resource ,
Link to a University of Minnesota resource , Link to a Wales' government resource ,
Link to a Microsoft resource , Link to a YouTube resource , Link to a YouTube resource

Theme: Other / Target Population: Designers and developers

Link to an "AHEAD Ireland" resource , Link to a regional government services resource

Subcategory: Accessibility of Virtual Reality

Target Population: Designers and developers

Link to a Google Scholar resource , Link to a W3 resource , Link to a UXdesign resource ,
Link to a YouTube resource , Link to a Bureau of Internet Accessibility resource

Subcategory: Translation and Language

Target Population: Designers and developers

Link to a Google Scholar resource , Link to a European Commission accessibility resource ,
Link to a W3 resource , Link to a "247 Accessible documents" resource ,
Link to a Bureau of Internet Accessibility resource , Link to a "Tech crunch" resource ,
Link to a YouTube resource

Subcategory: Chatbots, Avatars, and Online Support

Theme: Chatbots / Target Population: Designers and developers

Link to a Google Scholar resource , Link to an "Orange digital accessibility" resource ,
Link to a Bureau of Internet Accessibility resource , Link to a blog accessibility resource ,
Link to a W3 resource , Link to a UXdesign resource

Theme: Avatars / Target Population: Designers and developers

Link to a Google Scholar resource , Link to an "ACM digital library" resource ,
Link to a "HAL Open science" resource , Link to an accessibility related paper resource

Theme: Online Support

Link to an "Accessibility.com" resource , Link to a W3 resource ,
Link to a "Centre for Civil Design" resource

Subcategory: Other

Target Population: Designers and developers

Link to a "web dev" resource , Link to a University of Minnesota resource ,
Link to a European Commission accessibility resource ,
Link to a universal design (Ireland) resource , Link to a W3 resource

4.2 ADVISOR TOOL ADDITIONS

The Open Toolkit has a main output regarding the end-users' interest the Advisor Tool, a tool that enlists assets and applications towards accessibility. Apart from these tools, though, the LIVE IT team has enlisted tools for developers and web content designers and creators. Such tools can be used by all users to create digital contents, are populated in the Open Toolkit Advisor tool and are presented here in alphabetical order: Adobe Dreamweaver, Axe plugin, Bubble, Buildfire, Canva, Coolors, Corel Website Creator, Figma, Glide, Google Web Designer, Hootsuite, HTML Kit , Landbot, Magisto Magisto, Mail Chimp, Makerpad , Monday Marketer, Movavi Video Suite, NoCodeHQ, ObviouslyAI, OpenElement, Planable, RapidWeaver, Sheet2Site, Shopify, Site 123,

Sketch, Slickplan Website Content Planner, Square Space, Survey Monkey, Triggre, Universe, Webflow, Weebly, Wix and Zapier.

4.3 RECOMMENDATIONS

Designers: The scenarios envisaged during the LIVE IT project focus on situations that can currently be considered to be substantially rather rare. As a consequence, they are usually treated as marginal when designers approach issues of mainstream usability. This is a self-perpetuating problem, however, in that their relevance to mainstream projects is dangerously underestimated in everyday design and implementation work, not only in the field of the relationship between people with cognitive disabilities and online media, but across the board, in the field of how people with any form of disability, whether physical or cognitive, relate to the artificial environment in which we all live to a greater or lesser extent.
The recommendation offered to practising designers in the light of the many years of experience of Design for All (represented by its ambassador Pete Kercher who was a subcontractor of LIVE IT) is that they study these scenarios with care, so as to employ the lessons that can be learned from them as extreme-case situations, whose inclusion in a mainstream design process is posited as the litmus test for true inclusion.
Rather than merely copying these scenarios, however, designers are invited to embark on a coherent process of user involvement, in accordance with the methodology of Design for All, as quoted in the Stockholm Declaration (link), which states that "Design for All is design for human diversity, social inclusion and equality", then goes on to expound on the methodology with these words: "The practice of Design for All makes conscious use of the analysis of human needs and aspirations and requires the involvement of end users at every stage in the design process". This entails not only analysis, but a constant iterative process of consultation with those users who experience the most challenging situations in their interaction with the objective of the design process, since the ability to include such cases has been found to generate results that are also convenient, easier to use and thus beneficial to all mainstream users.

Developers: Every design process is a multifaceted partnership: while the designer acts as the leader of the process, the figure of designer should never be considered to be the sole figure of relevance. Just as an automobile designer would remain a theorist in the absence of the engineers who lend their expertise to translate the draft design into functioning models of good engineering, so a software designer must work in partnership with software developers and web designers must involve not only the end users mentioned in the previous section, but also the developers who work behind the scenes to codify the instructions elaborated by the designers. Once again, the accent here is on conveying also to developers the important message that the scenarios experienced in the – albeit short – lifetime of the LIVE IT project are of vital interest when applied in a sense that is not sectoral, so does not focus solely on the specific user groups

in question, important though their needs are, but mainstream in nature, in compliance also with the principles of Design for All.

The accessibility recommendations to be applied while these two partners create digital projects are aggregated in the following list:

- Maintain clear contents, use simple layouts, leave spaces between elements, use not much text, try to include visual or audio supporting
- Consider people that do not speak English, but either way use always plain language
- Ensure ease of navigation / guide users to what is the required action from them and what they should do / how they should act
- Tools should be accessible from start to finish, meaning that the installation process and optimization / setting procedures should also be accessible
- Create free tools, ad-free, accessibility should not facilitate only people able to pay – including updates
- Ensure dictation is working, especially with people not being able to pronounce / articulate perfectly
- Create tools to facilitate interpretation and processing numerical information, dates, tables, calculation and other complex forms of content
- Create tools that are easy to use / easy to follow – direct users to next steps
- Create a cross-platform button that enables text-to-speech or dictation features
- Create tools that can generate abstracts from long dense contents
- Create tools that can read lips to facilitate direct conversations
- Create tools that blur background to help users focus on text reading
- Create tools that provide the feature of profile setting according to challenges or per diagnosis and customise all digital content according to profile selected
- Create tools that can remove, blur, or hide media such as pictures, ads, videos or animations
- Create tools to facilitate PDF accessibility and compliance to standards and protocols
- Create a virtual assistant that can be adjusted based upon different diagnoses, for example when a user faces memory challenges, the virtual assistant could be used as a reminder, when there are reading problems, the virtual assistant could easily read content on screen by just pressing a button
- Create tools with no errors, bugs – it confuses PwCD more and makes them feel responsible for the error
- Too many options and elements may as well be confusing, especially when not presented simply
- Integrate visual / layout tools with text-to-speech tools to motivate users to read along readers
- Make tools compatible with most browsers / operating systems
- Readers' speed should be adjustable when not already

- Readers should use more human voices and not robotic digital voices
- Text-to-speech tools should integrate translation mode for live translations
- Use audio / visual elements and instructions to support text-based content
- Use chatbots or helpdesk and FAQ whenever possible
- The harder the disability, the harder the solution needed, nevertheless it should be aimed
- Digital skills acquisition is important for caregivers that often act as mediators / training delivery provision to caregivers, but also offering of know-hows and tutorials to end-users
- PwCD are still dependent to their caregivers to interact with existing tools but that should change - self-esteem, independency and privacy issues are caused by the required constant presence of mediators to digital interactions
- The digital world must move towards an environment where accessibility tools would be pointless and useless – the digital world should be accessible without tools and assistants.

5 CONCLUSION AND FURTHER DISCUSSION

The Final baseline Catalogue is a manually curated list of tools and platforms which implement some method to target interaction of people with cognitive disabilities. The catalogue contains tools targeting different domains and daily use cases with tools from countries across Europe.

This catalogue should be continuously maintained and disseminated as a reference of IT basic tools for inclusive web accessibility for PwCD. It should be included as part of IT teaching curriculum in the fields of PwCD. For this, search filters such as by country, type of service should be developed.

The catalogue stores information regarding evaluation and replicability of tools. Besides advising PwCD regarding best tools for web accessibility, it can be the pilar for development of new tools and for extracting guidelines regarding the most implemented as well as the least successful techniques and tools.

By implementing geographical tagging of inclusive web accessibility tools, the catalogue allows understanding gaps in the community, understanding which countries are most or least CD friendly regarding different types of services (public, banking, health, schooling, etc). This can

provide both a tool for developing and proposing new projects by promoters or help governments channelling funds to areas requiring most development.

6 ANNEX I – LIVE IT 'BEST OF BREED' PLATFORMS AND TOOLS UP TO DELIVERABLE DUE DATE

DysWebexia 2.0 is a model to make a text more accessible to people with dyslexia. According to W3C framework, as mentioned in paragraph 3.1.6., for content optimization for people with dyslexia, mentioned in paragraph 3.1.6, “content made for people with dyslexia tend to have: short paragraphs, short sentences, well-structured text with headings” and other features which, in general, DysWebexia 2.0 facilitates. DysWebexia 2.0 improves text content in order to be readable, comprehensible, provide synonyms of complex words. It also helps in text presentation, colours, font size, spacings etc. According to W3C framework, those features conform to “Summary of Existing Research and Guidelines” as mentioned in paragraph 3.5.9 for people with intellectual disability: “font size should be 12-14 point. Some people with intellectual disability may request a larger font”, “use dark-colour text or a light (not white) background”, “for headings, use larger font sizes in bold, lower case (Headings and Emphasis – 3.5.9). It also tries to make it more comprehensible by replacing complex words with synonyms as mentioned in paragraph 3.1.6.

WebHelpDyslexia is a browser extension to help people with dyslexia adapt content in order to facilitate reading. It implements features to change font type and size, remove text decoration, bold and underlining, changing foreground and background colours, change paragraph spacing, length and alignment, highlighting text, fading text to focus on specific parts and searching for synonyms. According to the W3C framework, as mentioned in paragraph 3.1.8 “Summary of Existing Research and Guidelines”, there are guidelines as: “good contrast between colour of the background and the text”, “use default-font settings, or provide a way for users to choose their own styles”, “for Headings, use a larger-font size in bold, lower case” (Headings and Emphasis –

3.1.8). In accordance with W3C framework, WebHelpDyslexia meets the guidelines as mentioned in paragraph 3.5.9, “font size should be 12-14 point. Some people with intellectual disability may request a larger font”, “use dark-coloured text on a light (not white) background”, “for headings, use larger font sizes in bold, lower case” (Summary of Existing Research and Guidelines/ Headings and Emphasis – 3.5.9). WebHelpDyslexia can also apply to accessibility of people with MCI and dementia, as mentioned in paragraph 3.4.8 for the importance of “strong contrast of images with content” (Summary of Existing Research and Guidelines – Research Sources – 3.4.8). WebHelpDyslexia also conforms to guidelines as mentioned in paragraph 3.7.6 in W3C framework, for people with Autism: “maintain a reading level that is adequate for the audience”, “ensure text readability: Sans-serif fonts, adequate text size, paragraph length, adequate colour contrast” (Readability and Language – 3.7.6).

Voiceover is an industry-leading screen reader that describes exactly what is happening in a device. It aims to improve accessibility for blind or visually impaired people. It does not conform into specific guidelines of W3C framework, but it can meet utility on devices in order them to be more accessible for people with visual problems such as elderly people with MCI or dementia.

Android Accessibility Scanner is an application that aims to make smart phones accessible. The Android Accessibility Scanner is a compilation of multiple Google apps that service people with visual, auditory, speech, or physical disabilities. It does not conform into specific guidelines of W3C framework but all of them have a significant implementation in the accessibility on androids and software by people with a wide range of cognitive and neurological disabilities.

MS Visual keyboard is a representation of the original keyboard which allows a user to type, by pressing keys using eye-mouse and trackballs. The alphanumeric keystrokes can also be sent to the applications of Microsoft Windows which have the support of Dynamic Exchange (DDE). It conforms to W3C framework mentioned in paragraph 3.6.8 (specific technologies) for people with

ADHD about word prediction software. The aforementioned conformation is based on its important features such as: word prediction, autocapitalization (following a comma, digits or hyphens).

MS Screen magnifier is a software that increases the size of the graphical contents of a PC screen. It is helpful for individuals with minor visual disorder, whereas individuals having major visual disabilities with no vision typically utilize screen reader. It meets the specifications according to W3C framework mentioned in 3.4.8 paragraph, for people with MIC and Dementia about simple and large graphics and large, clear buttons with graphics and text. This tool provides among others better observation of words and pictures.

MS Screen reader is an assistive that can be used for assisting blind humans or people with visual difficulties. Specifically, it is a software application that tries to pass on the contents of a screen to the disabled individuals by means of non-visible sources, synthetic speech or braille display. It conforms to W3C framework for people with ADHD, as mentioned in paragraph 3.6.8 about screen readers, “people with Dyslexia tend to use mainstream technologies (for instance, a spell checker) to help them. They may use screen readers that highlight text as they read.” (How They Use The Web and ICT – 3.1.5). In addition, MS Screen reader can also be helpful for people with ADHD, according to W3C framework for “Specific Technologies” as mentioned in paragraph 3.6.8, “Anecdotal evidence suggests that tools and assistive technologies, which have proven useful for adults and students with ADHD, include: […] screen readers”.

MS Speech recognition can be used as an approach in PC software in order to facilitate people with motor difficulties. It has 3 types: neural network-based technique; dynamic type warping (DTW) and Hidden Markov Model approach (HMM). Thus, the neural network-based approaches cannot be used in real life applications. It helps in accessibility in many disorders that affect mobility. It can be useful in ADHD since, “There are no specific assistive technologies for people with ADHD. There are, however, several iPhone and Android Apps that have proved useful to people with ADHD”

(W3C Framework). Between the technologies that have been proven that is helpful in people with ADHD is “speech recognition software” (“Specific technologies” – 3.6.8 W3C Framework).

MS Immersive Reader is a free learning Microsoft tool that uses proven techniques to improve reading for people regardless of their age or ability. This learning tool can improve reading comprehension and increase fluency for English language learners. Specifically, the user can change the font size, text spacing, background colour, split up verbs, nouns, adjectives and sub-clauses. Immersive reader can even work with pictures and books.

NVDA is a high-quality and accessible to all screen reader that allows blind and vision impaired people to access and interact with the Windows operating system and many applications by reading texts and audible indication of the mouse position.

Access Angel is a website manipulation tool. It can be used for text to speech conversion, page translation, screen masking, text optioning and font resizing along with speech recognition and page magnification. It can be used by people with a variety of cognitive impairments and assist in the creation of accessible digital content. It comes in two variations according to licensing, one basic that is free to use and one paid with enhanced functionality.

Be My Eyes Be My Eyes is a free app that connects blind and low-vision people with sighted volunteers and company representatives for visual assistance through a live video call. It is available on both Android and iOS smart phones.

TextHelp is a suite of products aiming to help people to understand and be understood in an online digital world. It provides tools for reading, writing, web authoring, website access, documents, text to speech, speech to text, overlay and colour filter options, scanning options, pictorial representations (widgits / pictograms), simplification and much more. Available for a range of

languages. 30 days free trials available for one user and device. TextHelp have agreed to be as supportive as possible to LIVE IT and are looking into the possibility of allowing extended free access.

ReachDeck and **Read&Write** are parts of the aforementioned **TextHelp** suite, providing specific assistance.

Snap and Read is a Firefox and Chrome add-on that can be used for text manipulation. It offers text to speech functionality that can be used for screenshot reading, text simplification (in terms of replacement of difficult words), text translation along with screen organizing and focusing by removal of distractions and colour masking. It comes in two variations according to licensing, one basic that is free to use and one paid with enhanced functionality. It is also offered as an iPad app.

Natural Readers is a Chrome add-on that can be used as a professional text to speech solution that converts any written text into spoken words. It also comes in two variations according to licensing, one basic that is free to use and one paid with enhanced functionality.

Baddage is a company that advise on, supply, install and support a wide range of both hardware and software tools to support people with visual, motor or reading disabilities such as dyslexia, to optimally compensate for the disability within home, study or work situations. It supplies a wide range of technological tools such as braille displays, head mice, screen magnifiers, eye-tracking systems and board cameras and all software packages for magnification, braille/voice output or voice input. Pricing and availability are on a case basis.

Switch Access for Android is, as title suggests, an Android app. It lets the user interact with an Android device using one or more switches instead of the touchscreen. It is free of charge.

ReadEZ Virtual Overlay Software is an application that works by changing the colours on your PC with the click of a button, so the user is allowed to view pdfs, web pages and other windows (which may not use Windows colours) in preferred colours. For many people facing visual stress (words appear to move/wobble/flicker when reading for any length time, eyes get tired, headache when reading etc.), ReadEZ helps to mitigate the symptoms. It provides coloured overlay, coloured lenses, changes in the background colour of the screen or tablet. The user could either have the overlay cover the entire screen or could size and move the overlay to cover just part of the screen. It is better working on Windows 7 and there is little insight about its performance in other search engines (e.g., IOS). It is accessible/available by the users for a fee (the users have to pay in order to use it).

Lucidspark Mindmapping Software is a software that uses a virtual whiteboard that the user (one or a team collaborate) uses to bring the best ideas to light. The white board is used as a mind map for breaking large concepts into specific ideas and offers an unlimited canvas for the user and his/her working team. Lucidspark provides the opportunity for integrations to its user, who could access it and select edit, share, or even create a «new mind map» (online whiteboard) online using other apps. By using the application of Slack, the user could insert a board in team's Slack channel or even start a «new board» directly from Slack. Also, Google Drive integration provides the opportunity to share the created board and at the same time maintain control with various access permissions. The software is available on Microsoft Windows, Linux, iOS. It is accessible/available by the users also by basic free option for the users could use a paid upgrade of the software.

Verbose Text to Speech Software is a desktop application available on MS Windows. It converts text to voice or saves it as an mp3. It is an easy and convenient text to speech converter that can read aloud or save spoken text to mp3 files. It comes in two variations according to licensing, one basic that is free to use and one paid with enhanced functionality.

Read Aloud is a website that uses text-to-speech (TTS) technology to convert webpage text to audio and can be used free of charge.

Awesome Highlighter is a Chrome add-on which comes as a Google app also. It is a text selection and highlighting tool that uses custom styles and actions with the highlighted text. Using of it, the user can delete highlighted text, display only the highlighted text on the current page or display only the highlighted text when he reopens the page, customize the highlight style like colour and intensity and finally Backup / Restore all the configuration and highlight information. It comes free of charge.

Grid 3 is a free of charge desktop application for MS Windows. It is a high-quality text to speech application that, with female and male voice of your choice, can "speak" anything the user wants, whether it is a quick communication already prepared, sentences made inside or outside the program or even read a web page.

Dolphin is a reading app for people with dyslexia, people low vision and blindness. Dolphin app includes a Guide Connect that contain «simple-talking» technology suitable for sight loss, and also a screen reading for Windows. More analytically, the software contains a simple talking step-by-step menus, a connected email, browse the web, write letters and scan your post, a "make video calls to friends and family", high contrast large print text adapted to the needs of the user, provided service to user to utilize human sounding voices and «remote control», touchscreen, keyboard or mouse. It is free of charge in the basic version, or a paid upgraded one through Google App and iOS.

Asana: Your Work Manager is an app available only on App Store for iPhone and iPad. It facilitates the coordination of plans, tasks and project in one shared space. It can switch between list, kanban board and calendar views and helps in tasks organisation and due dates setting. It also attaches

files in tasks with relevant information, so that they are easy-to-find.

Key2enable is a desktop application that aims to provide autonomy, learning and motion to PwCD and technology that helps in web accessibility. The Key-X smart keyboard gives the ability to write and navigate any computer and the Simplix software offers audio-visual activities for students and patients of any cognitive level. The TelepatiX app for Android on the other hand, helps paralyzed individuals write and vocalize sentences.

ClaroRead Windows is a desktop application available on MS Windows, also available in Android, iPad and ChromeOS. It can also be put in USB. Claro software develops assertive technology and software for people with special needs like learning disabilities (e.g., dyslexia) helping them succeed in their educational goals. It is a simple, easy-to-use and flexible software program that helps in reading, writing, studying, participating in exams and as a result, increasing anyone's confidence. It also provides reading any on-screen text out loud and improving writing in Microsoft Word. ClaroRead Plus and Pro help in reading aloud scanned paper, books and documents.

Dragon Speech Recognition Software is a desktop application available on MS Windows. It helps improving productivity documentation, as well as working faster and easier by talking. It provides fast dictation and high recognition accuracy that continually improves as it adapts to someone's voice.

Alexa «is Amazon’s cloud-based voice service available on more than 100 million devices from Amazon and third-party device manufacturers» (information provided by the official site). Alexa, provides the opportunity to build natural voice experiences. In order to help the customers, Alexa’s service provides a collection of tools: APIs, reference solutions, and documentation. The user could use the Alexa application, in order to ask questions and Alexa would reply as a person (customer manager). Alexa is available for free.

Liquid Mode is a mobile application that provides services to its users to simplify PDFs for improved readability on devices. “The mobile application provides to the users of the apps a reading experience powered by Adobe Sensei, Adobe’s artificial intelligence (AI) and machine learning technology”. Liquid Mode enhances PDF layout and adds features on-the-fly to help the user read documents on your phone and tablet. It provides a tool bar in order to improve his/her experience: a layout that mimics the HTML pages on the web, images that could be zoomed in for a better view, linked outline view, content sections (accordion widgets), back to top button at the document end. It is accessible through Adobe. It is available for free.

MindManager provides the users with the opportunity to build flowcharts, concept maps, timelines, diagrams, and visualize users’ data in many ways. It is available in Microsoft Windows, iOS and it is accessible/available by paid, but with a free trial.

Widgit software titles have been used in classrooms, healthcare settings and at home for more than 30 years to create a wide variety of symbol materials. The software addresses to teachers, parents and professionals, so they could use it to start creating their own symbol materials. The software provides simply drawn, colourful symbols that illustrate a single concept in a clear and concise way. It is accessible/available by paid, but with free trial.

SpeechTexter is a software where the user could type using his/her own voice. It is used as an application to voice to text. It also provides the Online voice recognition. As a software it could be characterized as simple to usage and with a fast speed. SpeechTexter is an online multi-language speech recognizer that could help users type long documents, books, reports, blog posts with their voice. It is available on Android, Add-on for Chrome and App while it is available for free to users.

The **Apple Suite** includes a collection of several tools for accessibility. The most common are Voice Control, Switch Control, Assistive Touch, Touch Accommodations, Back Tap, Siri, Accessibility

Keyboard, Hardware Keyboard Support, Dictation, Predictive Text, Notes, Voice Memos App. The **Apple Voice Control** is a utility that helps the user control all the actions of his/her iOS device only with voice commands. Users may use voice commands to interact with screen elements or edit text. Another great tool that uses voice commands is the virtual assistant **Siri**. Siri uses voice queries, gesture-based control, focus-tracking and a user interface to perform actions, answer questions and make recommendations. Another accessibility tool of Apple's pre-installed applications is **Voice Memos**. Users can edit and share their recordings. As users continue navigating through their accessibility tools installed in their Apple device, they find a tool that helps them type text using the keyboard. **The Accessibility Keyboard** provides advanced typing and navigation features, while on the other hand the **Apple Dictation** lets users dictate in fields they would otherwise type texts. The **Apple Predictive Text** suggests the next word or phrase based on what the user is typing, and the **Apple Hardware Keyboard Support** provides custom shortcuts for commonly used words and phrases. Other tools are focused on user navigation and interaction with their devices. The **Apple Switch Control** makes it easy and efficient to control an Apple device through a variety of adaptive switch hardware. Users can continue working on other adaptive devices without having to take any extra action, helping them in maintaining their autonomy. Finally, the **Apple Assistant Touch, Apple Touch Accommodations** and **Back Tap** are also tools that provide users a variety of custom interactions and layouts for easy accessibility and interaction with the iOS system.

AutoCorrect Windows 10 is, as title suggests, a desktop application available on MS Windows. It provides autocorrect when typing in a PC instead of identifying a misspelled word and underling it with a red line. AutoCorrect Windows 10 is free of charge.

AutoHotKey Microsoft Windows is a free of charge, desktop application available on MS Windows. It is a powerful open-source Microsoft Windows tool that can automate repetitive tasks, saving valuable time and effort in typing or searching / running a process the user usually does.

Live Transcribe & Sound Notifications provides the service of a «Live Transcribe & Sound Notifications» for free. Actually, it works by providing real-time transcriptions of user's conversations and sends notifications based on user's surrounding sounds at home. The notifications sent make aware of important situations at the user's home. Those services include fire alarm or doorbell ringing, so that the user responds quickly and directly. Users can find it as a Google App.

Helperbird is a supporting software for users with dyslexia. This software allows the users to change the website totally, via changing colours, fonts, sizes, text to speech, immersive reader, OCR, PDF support and use of 28 other features. User may use it in Microsoft Windows, and it is available by two ways: a basic free option and an upgraded paid option.

Zoom Text and Fusion includes a variety of training services including in-person training classes, online webinars, and product certification. It provides a ZoomText magnifier and its JAWs screen reader. It is accessible through the search engine of Microsoft Windows, and it is available for free to users.

Assistive Touch for Android provides a floating panel on the user's android screen. Via that application, the user could access other apps, games, settings and quick toggle, and also use the cleaning function in order to clean running background apps making his/her device faster. Assistive Touch is also an ideal app to protect the physical buttons (home button and volume button) while it could be proven useful for big screen smart phones free of charge.

Google Suite offers capabilities that users can access through browsers or Google store. For email messaging it provides the **Gmail** service that allows users to exchange free messages and attachments using a user-friendly environment. For browsing websites Google provides the cross-

platform web browser **Google Chrome** with a variety of accessibility tools and add-ons, created either by Google, open-source or third-party. Another tool for quickly meeting or events scheduling is the **Google Calendar** that allows users to create and edit events. It may be used as a reminder and a tool to help people keep track on things-to-do and it may turn out to be really helpful to people with memory problems or similar cognitive difficulties since all reminders can be edited and tailored to the users' daily needs. Event locations can also be added, and other users can be invited to the events, assisting caregivers or family to keep track on everyday required actions. The **Google Assistant** and **Google Keep** tools are provided to manage tasks, notes, daily reminders, audio, images.

Text from to Speech is an application that could be used to reform speech into written text. It is accessible through any browser and is accessible for free.

IFTTT provides support in order for the user to connect to his/her favourite apps, services, and devices to create new, seamless experiences. It is accessible by Google App available for free.

AYOA Mindmap is a Mindmapping application, which promotes to users mapping boards, whiteboards and also cultivates users task management and team working skills. It is accessible by Microsoft Windows and iOS free of charge for the basic option or a paid upgraded version.

Ghostery Browser provides tools to users such as Block Ads, Stop Trackers, and Speed Up Websites in order to protect their data. User may use it through their browser and as an Add-on for Chrome, while there is a free basic version and a paid upgraded one.

Grammarly is used through browser and as an Add-on for Chrome. It helps people with learning difficulties, especially those with difficulties in spelling issues, by providing them tools such as a grammar corrector.

IDEAL Group Reader is an application that allows the user to have access and utilize tools as a text reader and highlighter in their Android devices for free.

101 Online, Contact the Police, When to call 999 and **GP online services** are portals that provide guidance to users through their browsers on how to contact the emerging relevant services.

7 ANNEX 1.7

The LIVE IT project provided Annex 1.7 (an excel file titled “LIVE IT Baseline Catalogue – extended and enhanced Catalogue”) which can be found online through this link.