**Name, affiliation and email of chair(s)**

Chair - David Fazio (dfazio@helixopp.com), survivor of a traumatic brain injury, Founder of Helix Opportunity, World Wide Web Consortium Invited Expert to Accessibility Guidelines Working Group, Accessible Platform Architectures Working Group, Cognitive Accessibility Task Force, Silver Task Force.

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The Internet and the Web have become the main way people stay informed and current on news and health information; keep in touch with friends and family; and provide independence such as convenient shopping etc. People who cannot use these interfaces will have an increased feeling of having a disability and of being alienated from society.

Further, with the advent of the Web of Things, everyday physical objects are becoming increasingly connected to the Internet and have Web interfaces. Being able to use these interfaces now is an essential component of allowing people to maintain their independence, stay in the work force for longer, and stay safe.

Consider that the population is aging. By 2050, it is projected there will be 115 million people with dementia worldwide. It is essential to the economy and society that people with mild and moderate levels of dementia stay as active as possible, and participate in society, for as long as possible. However, at the moment, even people with only a mild cognitive decline may find standard applications impossible to use. That means more and more people are dependent on care givers for things that they could do themselves, increasing the crippling cost of care and reducing human dignity.

Cognitive Accessibility User Research is needed to better describe, and address, the challenges of using web technologies for people with learning disabilities or cognitive disabilities. The research challenge areas of particular importance are, but are not limited to: attention, stress, orientation, executive function, comprehension, literacy, memory, perception, and reasoning. User groups may be categorized by any of the following disabilities: Aging-Related Cognitive Decline, Aphasia, Attention Deficit Hyperactivity Disorder, Autism, Intellectual Disability, Dyscalculia, Dyslexia, and Non-Verbal. Additional user groups may be included, with appropriate reasoning. This invitation invites submissions to identify gaps in current technologies, suggest strategies to improve accessibility for these user groups, and develop guidance and techniques for web authors.

**Description of the STS and submission expected:**

More than 200 million people around the world, approximately 3% of the global population, has an intellectual disability, according to conservative estimates. That number is projected to increase to around 300 million by 2050, acording to World Health Organization data.

It is essential to the economy and society that people with intellectual, and cognitive, disabilities stay as active as possible, and participate in society for as long as possible.

The current state of standard web-based applications and other digital interfaces means that even people with only a mild cognitive decline may find them impossible to use. That means more and more people are dependent on caregivers for things that they should be able to do themselves, increasing the crippling cost of care and reducing human dignity.

The Internet and the Web have become the main method people use to:

* stay connected with the world around them;
* stay informed and current on news and health information;
* communicate with friends and family;
* conduct activities of daily living independently, such as shopping, and;
* increasingly interact with physical environments via the Internet of Things (smart doorbells, TVs, exercise devices, etc.)

People who cannot use these interfaces will have an increased feeling disability and isolation, as being alienated from society. This societal isolation and loss of abilities can, in turn, contribute to mental health issues.

Cognitive Accessibility User Research is needed to better address the challenges of using web technologies for people with neurological differences including cognitive disabilities or . The research challenge areas of particular importance to this Thematic Session are, but are not limited to:

* Attention
* Stress
* Cognitive load
* Spatial orientation
* Executive function
* Comprehension
* Literacy
* Memory
* Perception
* Reasoning.

User groups of particular interest to this Thematic Session are, but are not limited to, any of the following disability categories:

* Aging-Related Cognitive Decline
* Aphasia
* ADD/ADHD - Attention Deficit (Hyperactivity) Disorder
* Any level of Autism / Asperger’s
* IDD - Intellectual or Developmental Disability;
* Dyscalculia / Dyslexia / Dysgraphia

Additional user groups may be submitted with appropriate and related reasoning and concerns. This invitation invites submissions to identify gaps in current technologies, suggest strategies to improve accessibility for these user groups, and develop guidance and techniques for web authors. Some of the “user needs” identified by the World Wide Web Consortium’s Cognitive Accessibility Task Force worth exploring are:

1. **Helping users understand what things are and how to use them;**
2. **Helping users find what they need;**
3. **Using clear and understandable content and text;**
4. **Preventing the user from making mistakes and make it easy to correct mistakes when they do occur;**
5. **Helping the user focus and restore context if attention is lost;**
6. **Processes not relying on memory;**
7. **Providing help and support;**

**and**

1. **Adapting and Personalizing.**

Extensive details about each of these user needs are provided below:

1. **Helping users understand what things are and how to use them**

**Clear Purpose**

**U**sers with a memory impairment, attention impairment and/or executive function impairment need to understand the purpose of content so that they know if they are in the right place, and understand what they’re doing even if lose focus for a time.

This includes:

* Understanding what the website offers, or if they should move on;
* Understanding what features and content are on a page or if they should move on;
* Always recognizing where they are in the architecture of the website, application or multi-step process, even after they get distracted;
* Understanding the relationship between a page and the site/task, even after they get distracted;
* Easily understanding the context and purpose of a page;
* In videos and multimedia: understanding what is going to be in the video, they can jump to the content they need, and can restore context if they get distracted.

**Clear Operation**

Users with a memory impairment and/or executive function impairment find it hard to learn new interface design patterns. They need to know what controls are available and how to use them so that the site is usable for them.

This includes:

* Understanding my options and the tasks they can perform  and they can identify the controls they can interact with in order to complete actions;
* Understanding how to use all the controls and the effects of each action;
* They do not try to activate elements that are not controls.  Otherwise they just think the site is broken and give up;
* Controls do not move unexpectedly as they are using them;
* Understanding the consequence of each action, such as sending information, changing settings, changing the context or closing the application.
1. **Helping the user find what they need**

**Findable**

Users with a memory impairment, weak executive function and/or weak language processing skills, need to be able to find features and content easily, so that they can find things in a reasonable amount of time.

This includes:

* Identifying important information and critical functions on a page, quickly and easily;
* Accessing important information and the controls they need without scrolling or carrying out other actions. They are not hidden or off screen;

* Easily identifying content that they need, and do not need.  Information they need to know and important information stands out, or is the first thing they read, and it does not get lost in the noise of less important information;
* Accessing the feature they need using the minimum number of easy steps;
* Understanding the starting point for each specific task, such as applying for a job;
* Recognizing the design (as familiar) so that user interface elements such as menus, buttons and design components as well as elements common to many websites such as help and search are where they expect them to be and do not move unexpectedly;
* Easily searching for what they want;
* Easily finding previously searched for content;
* Easily navigating through the menu structure and organization of the site and page;
* The structure and menu categories make sense to them, so that they find what they are looking for, without looking in the wrong place;
* Easily understanding, navigating, and browsing both the site and page structure;
* Easily scanning the page and effectively informs them of priority and structure of the content.
1. **Using clear and understandable content and text**

**Clear Language (written or audio)**

Users with a language impairment, learning disability and/or a memory impairment, want the language used to be clear and easy for me to understand so that they can understand the content.

This includes:

* Understanding the language used including vocabulary, syntax, tense and other aspects of language;
* Easily distinguishing the content from the background distractions;
* Including accents, characters and diacritics that are necessary to phonetically read the words (This is often needed for speech synthesis and phonetic readers in languages like Arabic and Hebrew.);
* Not having unexplained, implied or ambiguous information because they may misunderstand jokes and metaphors;
* Providing short summary for long pieces of content or an option for an easy to read version;
* Using images, diagrams or video clips to help them understand ideas, as opposed to using a lot of words;
* Symbols (pictographic or ideographic that represent concepts).

Users with complex communication needs that may include a mild language impairment, need symbols that help them understand the content.

This includes:

I need symbols to help understand essential content, such as controls and section headings

I need symbols that I understand and are familiar to me; recognizable, commonly used symbols (or personalizable)

I need symbols placed above the text to link the meaning of the words with the images.

**Symbols (pictographic or ideographic that represent concepts)**

Users with a severe language impairment, who have managed to learn a symbol vocabulary, need to have symbols on top of each phrase and very simplified language. Of course, it is best if they understand the symbols and they are the ones they have learned (via personalization)

**Media**

Users with weak executive functioning and attention impairments, need media presented in small chunks of understandable content, so that they can understand the main points and not lose focus.

This includes:

* Easily navigating to what they want, taking breaks and easily jumping back a step if they get confused or get distracted, when they are using small segments of multimedia that have navigable text or labels that describe the segment;
* Understanding plain language used in the media;
* Using a clear structure to help them navigate and understand different parts of the media;
* Using visual aids and pictures to help them understand the media content.

**Visual Presentation**

Users with a language impairment, learning disability and/or an impaired memory, need a page layout that helps them follow and understand the content without getting overwhelmed.

This includes:

* Short boxes or chunks of content or sections that are easily readable. These usually have:

-- Clear headings

-- Short paragraphs and sentences with one idea

-- Good use of lists

-- Pictographic symbols next to headings, labels and links

* Good use of white space for easy reading;
* Good use of white space between lines, sentences or phrases;
* Good use of white space between chunks, so that the chunks are clear and the page does not get overwhelming;
* Providing explanations of implied content, like body gestures and facial expressions seen in images and animations.

**Math Concepts**

Users that do not understand numerical concepts need content to be usable without understanding math concepts.

This includes:

* Making content usable without understanding math concepts, such as percentages;
* Not using math concepts in content or providing multiple alternatives without math symbols;
1. **Prevent the user from making mistakes and make it easy to correct mistakes when they do occur.**

**Assistance and Support**

Users that have difficulty with organization (executive functioning), typing, and putting letters and numbers in the right order, need an interface that helps them avoid making mistakes, complete forms and other similar tasks successfully.

This includes:

* Interfaces that make mistakes less likely by helping them avoid mistakes, as well as minimize the mistakes they might make;
* Requiring them to enter as little information as possible, so the task is more manageable;
* Interfaces providing only valid options, so they can select the ones they want;
* Dividing long numbers that often have spaces, like credit card numbers, into chunks. That way they find it easier to check it;
* Inputs accepting different formats without marking them as mistakes;
* Interfaces using metrics familiar to them, and that are common in their location (such as feet or meters);
* Using applications or APIs that help them, such as remembering their information so they do not need to enter it again and have help with their spelling;
* Clear labels, step-by-step instructions and clear error messages, articulating exactly what to do;
* Examples making it easy to understand what they need to do;
* Clear, and simple, explanations of options or choices helping them understand what they mean;
* Helping them manage their time, such as letting them know how long a task will take;
* Preventing sessions from timing out while they try to find information needed, such as my postal/zip code or social security number;
* Saving their work as they go or ensuring all their work is saved automatically. They do not want to have to start over again, which can create a cycle of reentering their data. This tires them more easily and increases their likelihood of making mistakes;
* Supporting task management, such as letting them know what information they will need (credit card, full address etc) before they start.

**Undo**

Users that often makes mistakes or touch the wrong thing, need to be able to undo what they just did quickly and easily so that they can manage to use applications and not give up.

This includes:

* Checking their work and going back without losing the work they have just done;
* Easily going back to where they were in one simple step if they touch the wrong control;
* Predictable back or undo features so they’re exactly where they were previously, before they made a mistake.
1. **Help the user focus and restore context if attention is lost.**

Users with an attention impairment and weak memory, I need to be able to avoid distraction and restore the context after I lose focus and come back to the task, so that I can complete the task I am trying to do.

This includes:

* Eliminating distractions from tasks;
* Easily removing, or turning off distractions.

Users that need help to stay focused, need help understanding where a task starts and finishes to help with switching attention so that they can focus on the task.

* I need to know the context, where I am, what I just did, or what just happened to me after I lost focus and then needed to come back to the task.

Users with poor short-term memory, need to be able to go back or see information about where they are in a site so I can re-orientate themselves.

Users that get disoriented, need to know where they are in a process, including what they have done and what my next step will be.

1. **Processes do not rely on memory.**

Users with short-term and working memory difficulties, need access to information they entered during previous steps in a process.

**Accessible Authentication**

Users that have memory impairments, and often forget passwords, and have weak executive function, need a method of secure website authentication that they can use.

This includes:

* Being able to use a site without remembering or transcribing passwords and usernames;
* Not having to decipher a lot of words or symbols;
* Simple, and not multi-step, login processes.

Symbol users need a login process they can use that does not rely on a lot of words

They need a login process that does not contain puzzles or calculations.

1. **Provide help and support**

Users that often can’t use a website need to be able to give feedback easily from every place where they get stuck. This ensures they’re not excluded and the site is aware of their needs.

This includes:

* Giving feedback from any point in the process;
* Asking questions and getting feedback:
	+ In a similar time frame to everyone else
	+ Using their preferred communication method (form, email, chat, phone support etc) that are being provided, and it’s accessible to them;
* They understand how to get help or information, such as from context-sensitive help or tooltips;
* They understand how to get human help and can manage the process easily;

Users that often can’t use a website sometimes need in-page and inline support so that they are able to use the content.

This includes:

* help and support to personalize their own settings that include symbols familiar to them;
* clearly differentiated help and main content should be so they do not confuse them;
* Contextually-relevant graphs and pictures to supplement text so they can understand a point without a lot of reading, such as graphs;
* Speech support, with synchronized highlighting, so they can follow as they go;
* Rapid feedback or visual cues to indicate an event was successfully triggered, such as email sent indicators, otherwise it looks as if it has just disappeared;
* Reminders integrated into their calendar, otherwise they will forget appointments and when they need to do things. Sometimes they need reminders to revisit a web site to complete the next task;
* Users with an attention disorder get distracted by too many reminders. They need to be able to control when reminders are sent, the frequency and type of reminders.

Users that struggle using web content due to executive function impairment and/or struggle with numerical concepts, need to be confident that they can manage tasks.

This includes:

* + Explanations for unusual controls in a form they find easy to use (such as a video or text);
	+ Support and explanations for any choices. The advantages or disadvantages must be clear to them and they must understand the effects the choice might have. For example when choosing a cheaper airline ticket that requires them to pay for a meal;
	+ Understanding how to start a task, and what is involved such as:
		- The steps involved;
		- A time estimate and any time limits;
		- Any materials they may need (such as a credit card number, passport number,  questions that authenticate login such as “their mother’s maiden name”).
		- Support and instructions are understandable to help them organize their time and steps;
		- Any limitations are clear to them before they begin;
	+ Turning off any distractions during a task, and help is available at any point.
1. **Adapt and Personalize**

Users with short and medium term memory impairment and weak executive function need a familiar interface so that they do not need to figure out and remember new interfaces.  This may take a few weeks of repetition and they may not manage to learn it all if they have a condition affecting learning new things, such as dementia.

This includes :

* A version of the interface that is familiar to them, that they recognize and understand what will happen;
* Controls that are consistently positioned on the screen where they expect them to be;
* Content delivered in an easy to understand language or an easy-to-understand mode;
* Alternatives to spoken and written language such as icons, symbols or pictures;
* Words and speech to text to support the use of symbols and pictures where they are not easily recognizable;
* Video and pictures that help them understand the content without so much reading of text
* Additional support features from widgets or extensions. Providing an extension that  helps me correctly enter words, grammar and use punctuation as well as read the page to them, for example;
* Easy to use gestures on a touch screen or the possibility of alternative access;
* Ways of expressing ideas without so many words, such as using speech recognition or pictures;
* More white space can be added between lines, sentences, phrases and chunks;
* Alternatives to the presentation of mathematical concepts;
* The ability to select the content format or version of the content that is easiest for them to understand;
* Content without extra options and features to reduce cognitive overload;
* Being able to find the extra features when they want them;