Functional needs for cognitive

Framework for Accessible Specification of Technologies (FAST) see
https://w3c.github.io/fast/#cognitive
This does not included a review of functional needs intersectionality : use with text to speech that is simple

This table is COGAs input for functional needs

- The first section of this table are items that we feel need to be added to or extended,The extended definition is in the last column.
- The second section is new categories that we feel are omitted.
- Note that we believe co morbidity is very important as well
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FAST	**FAST Includes reduced ability for:**	**What Coga think is missing**
Attention	• *focus attention* • *direct attention* • *shift attention*	• **Direct attention** and focus on the users key task and page purpose • **Sustained attention** • **Restore context** after focus is lost and return attention
Language & Communication	• comprehend spoken language • ability to read • recognize written language • comprehend written language • write • correctly write (or type) words and use punctuation • without understanding symbols • understanding metaphors, idioms, euphemisms, or specific dialect of culture or location	Coneses: **replace the list to the left, with the following:** • Receptive communication • Expressive/productive communication • Language (from different sources, such as auditory discriminatory, visual memory etc) • Literacy • Non language and sublinguistic communication

FAST	FAST Includes reduced ability for:	What Coga think is missing
		---------- **discussion** Can we have Language and non language Communication separate buckets. Does non language communication get lost otherwise? Items to include: Non-language communication (CM) can include: ● Implied communication, body language understanding metaphors and non literal language ● Listening Ability(LS) ● Information about Culture (K2) ● Range of stored general cultural knowledge (e.g., music, art) ● ● Understanding visual cues(symbols, spacing etc) ● understanding appropriate behaviors Language: Speak, write, read, or understand speech , sign, symbols and/or other language. Includes: ● Language Development ● Lexical Knowledge

FAST	FAST Includes reduced ability for:	What Coga think is missing
		(VL) ● Oral Production and Fluency (OP) ● Grammatical Sensitivity (MY) ● Morphology and sentences (syntax) ● Foreign Language Aptitude (LA) ● interocular transfer of visual memory (retrieval based on limited acuity in a single eye) ● phonological or phonemic awareness ● Auditory discrimination `Receptive vs expressive/productive communication is another way to divide it` ●
Learning	● understanding of math and numeric concepts ● compositional skill (simultaneous thinking and input) ● coordination skill (motoric skills, visual-spatial organizational memory, and social)	Replace with: ● New skills ● New information ● New interface ● New terms ● New symbols (note that someone with early dementia may have wonderful language, but not be able to learn any new terms etc) ● Understand new or complex information

FAST	FAST Includes reduced ability for:	What Coga think is missing
Memory	short-term or working memory medium or long-term memory sensory memory -Visual -Visual-spatial -Auditory	**Context Based§** ● **Episodic memory** (autobiographical – time, self) ● **Semantic** memory (factual) ● **Musical memory** ● **Auditory memory:** Memory for sound patterns (UM) ● **Procedural memory:** Memory for performance of particular types of action such as walking. ● **Prospective memory**: Much of what we have to remember in everyday life involves prospective memory — remembering to do things in the future, such as keep appointments, return a book to the library, or pay bills on time. [http://www.ncbi.nlm.nih.gov/books/NBK3885/] ● **Emotional memories:** can be both declarative- and procedural-memory processes. **4.2.3 Awareness Based§** ● **Implicit memory**: (Can be called non-declarative memory) is built or used without conscious awareness.

FAST	FAST Includes reduced ability for:	What Coga think is missing
		In contrast with... ● **Explicit memory**: (Can be called declarative memory) the intentional use of memory such as remembering the time of an appointment or studying for an exam. Also, memories can be stored and recalled as **Associative Memory** (AM), **Meaningful memory**(MM), **Free-recall memory** (M6),
Executive	● planning, organization, sequencing, and execution ability ● ??emotional control and self monitoring ● judgment	Reasoning Understanding Decision making Judgment visual, language, or numerical thinking. Self regulation Note that attention and working memory are also often called part of Executive function Pacing and response time Planning and changes/switching plans

FAST	FAST Includes reduced ability for:	What Coga think is missing
Mental Health and emotional regulation **Note we believe this may needs more work**	● Use with debilitating sensitivity to negative emotional stimuli	● Emotional regulation (triggers and others) impulse control ● Specific content needs such as relating to addictive issues or food, triggers ● Mood - depression, mania etc ● Anxiety fears Stress and pressure ○ Social, paranoia , fear of how people will react to your issues ○ fear of types of situations , lines/ crowded , fear of travel ● Disturbed thoughts Trouble with organized thoughts , concentration/ mind going blank, indecisive, memory gaps ● -Exaggerated or unhealthy responses, such as irritation, love, anger, guilt, self hate ● -Derealization, (detachment from reality) or depersonalization , ● dissociative reactions, detachments ● Persistent negative beliefs and false physical interpretation ● Physical disability and symptoms (from somatic disorders and other physical symptoms, nausea, fainting, short of

FAST	FAST Includes reduced ability for:	What Coga think is missing
		breath) • Repetitive or obsessive behaviors • Identifying reality, such as Psychosis • Altered sensory and motor, psychomotor changes. • Fatigue / insomnia NOTE Coga is working on guidance to help with these and other functional needs
Cognitive & Sensory Intersections **See Psychomotor and coordination bellow**	• interocular transfer of visual memory (retrieval based on limited acuity in a single eye) • phonological or phonemic awareness	We would remove this. They belong in other places like language We also added **Psychomotor and coordination** which is a similar and clearer category
New proposed buckets		
Processing		**Processing**, and processing speed, fluency Cognitive overload and fatigue
Knowledge		**Knowledge** such as: Types of knowledge that might be required for use of Web content include: • knowledge of culture • base • Language knowledge, including: • lexical (UL) • jargon (subject matter) • Background and subject matter -

FAST	FAST Includes reduced ability for:	What Coga think is missing
		including jargon and technology ● Web and technology usages and risks ● metaphors and idioms ● icons and symbols ● mathematical knowledge ● mechanical Knowledge (MK) ● knowledge of behaviors ● Design metaphor – look ● Design functions ● Who to trust and credibility
Sensory processing		**Sensory processing differences** -overloads, etc

FAST	FAST Includes reduced ability for:	What Coga think is missing
Orientation		**Orientation** ● Where you are in physical space, ● Where you are in a process ● Where you are in a site ● Where you are in a page

FAST	FAST Includes reduced ability for:	What Coga think is missing
		• Where you are in time
Mathematical		• Understanding of math abstractions and numeric concepts • Computational skill

Psychomotor and coordination		• Coordination skill (motoric skills, visual-spatial organizational memory, and social)
		• Compositional skill such as:
		  ○ Simultaneous thinking and input
		  ○ Communication that requires multiple cognitive functions such as talking and/or signing while thinking
		  ○ Divided attention

Compare to
Use without hearing (born deaf)
Use without hearing (acquired)
Use with limited hearing

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- Our references: research-on-cognitive-function and coga-usable/#appendix-mapping

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Missing:

From the matrix

Taken from
https://docs.google.com/spreadsheets/d/1POhgI_xHZtSoNbHFp3r5HYIkl6ePaP8DC5d90SZ1tF4/edit#gid=470134919

From FAST

In https://w3c.github.io/fast/#cognitive

2.4.1 Attention

2.4.1.1 Use with limited ability to focus attention

2.4.1.2 Use with limited ability to direct attention

2.4.1.3 Use with limited ability to shift attention

2.4.2 Language and Communication

2.4.2.1 Use with limited ability to comprehend spoken language

2.4.2.2 Use without ability to read

2.4.2.3 Use with limited ability to recognize written language

2.4.2.4 Use with limited ability to comprehend written language

2.4.2.5 Use without ability to write

2.4.2.6 Use with limited ability to correctly write (or type) words and use punctuation

2.4.2.7 Use without understanding symbols

2.4.2.8 Use without understanding metaphors, idioms, euphemisms, or specific dialect of culture or location

2.4.3 Learning

2.4.3.1 Use with limited understanding of math and numeric concepts

2.4.3.2 Use with limited compositional skill (simultaneous thinking and input)

2.4.3.3 Use with limited coordination skill (motoric skills, visual-spatial organizational memory, and social)

2.4.4 Memory

2.4.4.1 Use with limited short-term or working memory

2.4.4.2 Use with limited medium or long-term memory

2.4.4.3 Use with limited sensory memory

2.4.4.3.1 Visual

2.4.4.3.2 Visual-spatial

2.4.4.3.3 Auditory

2.4.5 Executive

2.4.5.1 Use with limited planning, organization, sequencing, and execution ability

2.4.5.2 Use with limited emotional control and self monitoring

2.4.5.3 Use with limited judgment

2.4.6 Mental Health

2.4.6.1 Use with debilitating sensitivity to negative emotional stimuli

2.4.7 Cognitive and Sensory Intersections

2.4.7.1 Use with interocular transfer of visual memory (retrieval based on limited acuity in a single eye)

2.4.7.2 Use with limited phonological or phonemic awareness

From content usable

https://www.w3.org/TR/coga-usable/#glossary

Cognitive and Learning Disabilities

May include: cognitive disabilities, learning disabilities (LD), intellectual disabilities and specific learning disability.

Cognitive disabilities and learning disabilities can mean different things in different locations. Taken together they refer to:

- significantly reduced ability in one or more areas of cognitive function that affect **learning,** such as **communication, reading, writing, or math**. Note overall intelligence is often not affected and people may function any level in other areas of learning. (Sometimes called learning disability or specific learning disability), and / or
- significantly reduced ability to **understand new or complex information and learn new skills,** with a reduced ability to cope independently. (Sometimes called cognitive disability, learning disability or intellectual disability), and / or
- significantly reduced **memory and attention or visual, language, or numerical thinkin**g.

(add orientation?)

From the research module

https://www.w3.org/TR/coga-user-research/#research-on-cognitive-function

Educational taxonomies, such as Carol for Cyristalised resing, includes:

- Language Development
- Lexical Knowledge (VL)
- Listening Ability(LS)
- General (verbal) Information (K0)
- Range of general stored knowledge (primarily verbal)
- Information about Culture (K2)
- Range of stored general cultural knowledge (e.g., music, art)
- Communication Ability (CM)
- Oral Production and Fluency (OP)
- Grammatical Sensitivity (MY)
- Morphology and sentences (syntax)
- Foreign Language Proficiency (KL)
- Foreign Language Aptitude (LA)

2. Inappropriate behavior is common with Frontotemporal dementia - impaired social interaction.

Affected in: Alzheimer's disease, Aphasias, Advanced age, dyslexia, emotional disabilities such as Schizophrenia and PTSD

4. Expressive aphasia left inferior frontal cortex. These people are described with having severe syntactical deficits, which means they have extreme difficulty in forming sentences correctly. Hessler, Dorte; Jonkers, Bastiaanse (December 2010). "The influence of phonetic dimensions on aphasic speech perception". Clinical Linguistics and Phonetics. 12 24: 980–996.

5. Receptive aphasia - left temproparietal lobe. People with Receptive Aphasic mostly suffer from lexical-semantic difficulties, but also have difficulties in comprehension tasks. The effect of receptive aphasia on understanding is much more severe. Hessler, Dorte; Jonkers, Bastiaanse (December 2010). "The influence of phonetic dimensions on aphasic speech perception". Clinical Linguistics and Phonetics. 12 24: 980–996.

Anarthria: Loss of the motor ability that enables speech. Complete loss of the ability to vocalize words as a result of an injury to the part of the brain responsible for controlling the larynx.

Aphonia: The inability to produce voice.

Alalia: A delay in the development or use of the mechanisms that produce speech.

Dyslalia: Difficulties in talking due to structural defects in speech organs.

Developmental verbal dyspraxia: Motor speech disorder involving impairments in the motor control of speech production.

6. Carol tends to have abilites as the main category with memory and sensitivity, such as tactile sensitivity (other than psychomotor abilities, which have subcategories of static strength (P3), multi-limb coordination (P6), finger dexterity (P2), manual dexterity (P1), arm-hand steadiness (P7), sontrol precision (P8), aiming (A1), gross-body equilibrium (P4)

7. Carol brings Processing speed (Gs), such as cognitive processing speed (Gs), broad-cognitive speediness (Gs), perceptual speed (P), rate-of-test-taking (R9), number facility (N), speed of reasoning (RE), reading speed (RS), writing speed (WS), reaction and decision Speed (Gt), correct decision speed (CDS), processing speed, (RT) decision speed (such as simple-reaction time) (R1), choice reaction time (R2), semantic processing speed (R4), mental-comparison speed (R7), inspection time (IT)

8. Carol brings Ideational Fluency (FI), Associational Fluency (FA), Expressional Fluency (FE), Word Fluency (FW), Figural Fluency (FF), Figural Flexibility (FX), Sensitivity to Problems (SP), Originality/Creativity Fluency (FO), Learning Abilities (L1), Naming Facility (N)