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Updating EN 301 549: cognitive accessibility

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- This work is being done at ETSI
- It is an EC/EFTA co-funded work



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ETSI and EN 301 549

What is ETSI?

- The European Telecommunications Standards Institute
- One of three European standards organizations
 - ETSI, CEN, CENELEC
- Officially recognized by the EU & EFTA
- Setting globally-applicable standards, active in all ICT
- An independent, non-profit organization, created in 1988
- More than 800 members from 64 states
- Offering direct participation of all members
- More than 15,000 publications at no charge!

ETSI and mobile ICT

- ETSI is the home of the GSM standards
- Founding partner in 3GPP and LTE
- And a lot of others
 - e.g. ISDN, DECT, DAB, DVB ...



ETSI interest in Human Factors

- Why?
 - Even communication networks are made for “real users”
 - The success of an ICT device is largely decided by its user experience
 - Range of ICT users broadening – children, older, disabled people

“I have always wished for my computer to be as easy to use as my telephone; my wish has come true because I can no longer figure out how to use my telephone.”

(Bjarne Stroustrup)

ETSI TC HF

- Technical Committee – Human Factors
- Main scope: usability and accessibility
- Formed in 1989
- It has produced a very broad mix of guides and standards
- For example

ETSI TC HF: Examples of Deliverables

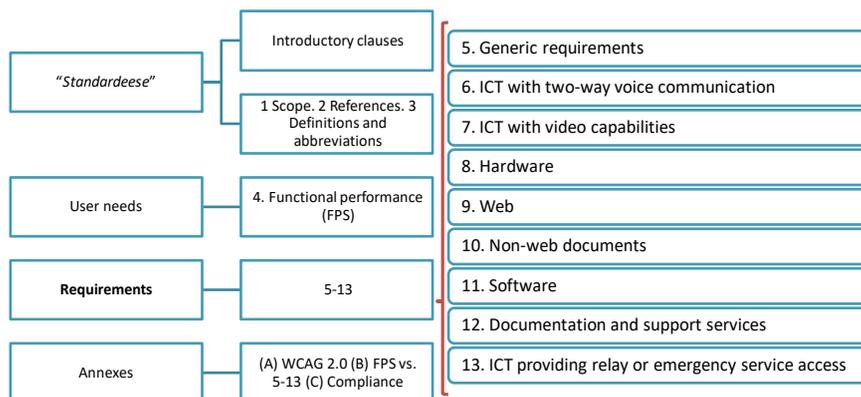
- **EN 301 549** “Accessibility requirements suitable for public procurement of ICT products and services in Europe”
- **ES 202 076** “Generic spoken command vocabulary for ICT devices and services”
- **ES 202 130** “User Interfaces; Character repertoires, ordering rules and assignment of the 12-key telephone keypad”
- **ES 202 746** “Personalization and User Profile Management; User Profile Preferences and Information”
- **EG 202 116** “Guidelines for ICT products and services; ‘Design for All’”
- **EG 202 487** “User experience guidelines; Telecare services (eHealth)”
- **EG 202 191** “Multimodal interaction, communication and navigation guidelines”
- **EG 202 848** “Inclusive eServices for all; Optimizing the accessibility and the use of upcoming user-interaction technologies”
- ...

EN 301 549

- Mandate M 376 from EC
- CEN/CENELEC/ETSI
- Accessibility requirements for any ICT
- Published in 2014
 - Amended in 2015
- European Equivalent to Section 508
 - Only the “standards”



Structure of EN 301 549



Support for cognitive issues in EN 301 549

Functional performance statement 4.2.10

Usage with limited cognition

Some users will need the ICT to provide features that make it simpler and easier to use.

NOTE 1: This clause is intended to include the needs of persons with limited cognitive, language and learning abilities.

NOTE 2: Adjustable timings, error indication and suggestion, and a logical focus order are examples of design features that may contribute towards meeting this clause.

Mapping EN 301 549 to cognitive

Clause	Primary relationship	Secondary relationship
5. Generic requirements	-	22
6. ICT with two-way voice communication	-	1
7. ICT with video capabilities	-	7
8. Hardware	1	1
9. Web (WCAG AA)	17	15
10. Non-web documents	13	15
11. Software	12	40
12. Documentation and support services	-	3
13. ICT providing relay or emergency service access	1	3

Examples of primary relationships

- **Hardware**
 - 8.1.2 Standard connections
- **Web/Documents/Software (WCAG-based)**
 - 9.2.17 Timing adjustable
 - 9.2.18 Pause, stop, hide
 - 9.2.22 Focus order
 - 9.2.25 Headings and labels
 - 9.2.29 On focus
 - 9.2.33 Error identification
 - 9.2.36 Error prevention
 - ... *related to Operable/Understandable in WCAG AA*
- **Relay services**
 - 13.1.6 Speech to speech relay services

Examples of secondary relationships

- | | |
|---|---|
| <ul style="list-style-type: none"> • Generic <ul style="list-style-type: none"> – 5.1.x Replacement of assistive technology if closed functionality – 5.4 Preservation of accessibility information – 5.8 Simultaneous user actions – ... • Two-way voice communication <ul style="list-style-type: none"> – 6.3 Caller ID • Video <ul style="list-style-type: none"> – 7.1.x Captions – 7.2.x Audio description • Hardware <ul style="list-style-type: none"> – 8.1.3 Colour | <ul style="list-style-type: none"> • Web/Documents/Software (WCAG-based) <ul style="list-style-type: none"> – Mostly related to programmatic access to presented information (for assistive technology: 9.2.1, 9.2.2, ...) • Software only <ul style="list-style-type: none"> – 11.3.x Interoperability with assistive technology – 11.5 User preferences • Documentation and services <ul style="list-style-type: none"> – 12.1.x accessible documentation • Relay services <ul style="list-style-type: none"> – 13.2 Access to relay services – 13.3 Access to emergency services |
|---|---|

EN 301 549 & cognitive: conclusions

- There is (some) support for cognitive issues
- Most of it is not strong
 - Secondary relationships with the 4.3.10 user need
- **More work is needed!!**
 - Also recognized for WCAG
 - Cognitive A11Y TF (for the Web)
 - And in ISO
 - ISO TC 173/WG 10 (basic principles)
- ... and there is active research in the field

ETSI STF 488

Specialist Task Force (STF) 488

Recommendations to allow people with cognitive disabilities to exploit the potential of mobile technologies

Background to STF 488

- Most of current accessibility guidelines focus on sensory or mobility
- There is a need for explicit guidelines for designing for people with cognitive impairments.
- ETSI STF 488 aims to address this gap
 - By producing guidelines for the design of devices and services to also cover the needs of people with cognitive impairments

STF 488: deliverables

ETSI DEG 203 350

Human Factors (HF);
Guidelines for the design of mobile ICT devices and their related applications for persons with cognitive disabilities

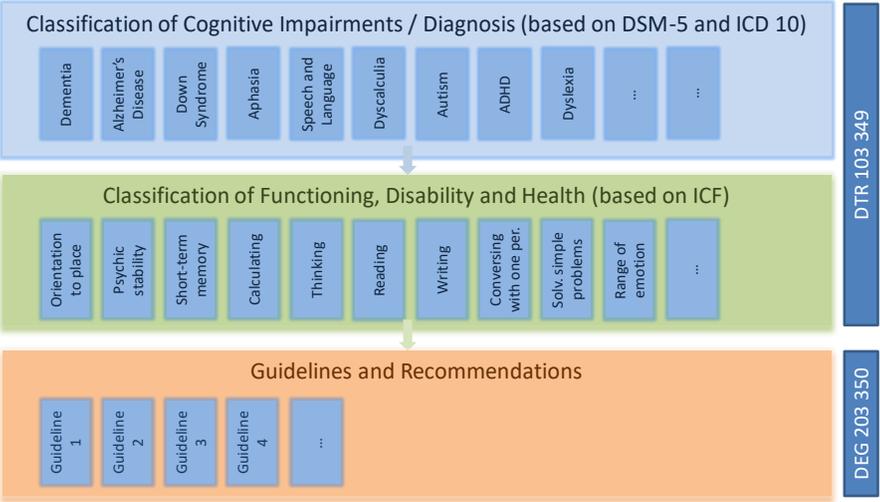
ETSI DTR 103 349

Human Factors (HF);
Functional needs of people with cognitive disabilities when using mobile ICT devices for an improved user experience in mobile ICT devices

ETSI STF 488: working approach



Approach of STF 488: overview



Step 1: cognitive impairments / diagnoses

- Two recognised **classifications**:
 - Diagnostic and Statistical Manual of Mental Disorders (DSM-5)
 - International Classification of Diseases and Related Health Problems (ICD-10)
- **Selection** of subset of impairments/diagnoses:
 - Prevalence: how many people are affected
 - Can the people affected by it be reached?
 - Can the affected people be helped with mobile technology?

Selected impairments / diagnoses

- Mild, Moderate, Severe or Profound Cognitive Impairment and Dementia (neurodevelopmental)
- Major or Mild Neurocognitive Disorder Due to Alzheimer's Disease
- Down Syndrome
- Aphasia
- Non-verbal Severe Speech and Language Impairments
- Autism
- Attention deficit hyperactivity disorder (ADHD)
- Dyslexia
- Dyscalculia

Example: dementia

- Including Alzheimer's disease
- Deterioration in cognitive function beyond what might be expected from normal ageing
- It affects:
 - Memory, thinking, orientation, comprehension, calculation, learning capacity, language, and judgement.
- Commonly accompanied by deterioration in:
 - Emotional control, social behaviour, or motivation

Dementia: prevalence

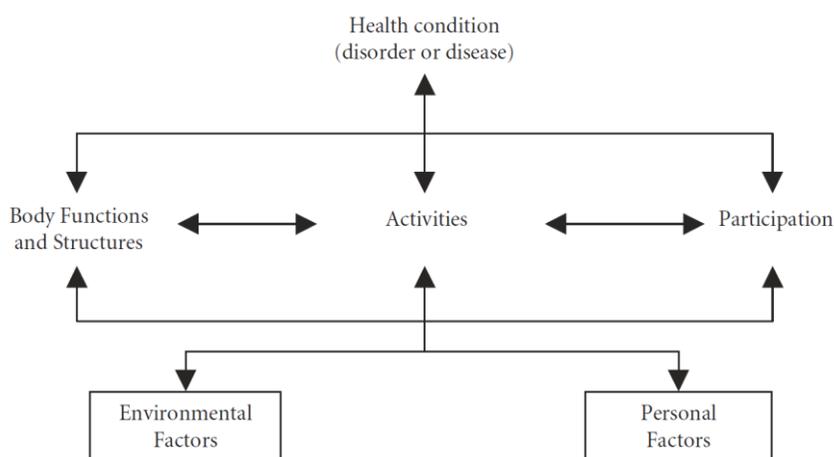
- Worldwide:
 - 47.5 million people have dementia
 - 7.7 million new cases every year
- Estimated proportion of the general population aged 60 and over with dementia
 - Between 5 to 8 per 100 people
- Projected to be
 - 75.6 million in 2030
 - 135.5 million (almost triple) by 2050

Source: WHO Fact sheet Nr. 362, March 2015

Step 2: functional user needs

- **ICF/ICF-CY** is being referenced:
 - International Classification of Functioning, Disability and Health (Children and Young)
 - WHO
- For each cognitive impairment
 - ICF **functions and activities** are being extracted
 - Based on impairment descriptions and “core sets”
 - **Emphasis on activities**

ICF model



Some ICF functions

- **b1401 Shifting attention.** Mental functions that permit refocusing concentration from one stimulus to another
- **b 1402 Dividing attention.** Mental functions that permit focusing on two or more stimuli at the same time
- **b1440 Short-term memory:** mental functions that produce a temporary, disruptable memory store of around 30 seconds duration from which information is lost if not consolidated into long-term memory
- **b1441 Long-term memory:** Mental functions that produce a memory system permitting the long term storage of information from short-term memory and both autobiographical memory for past events and semantic memory for language and facts
- ...

Some ICF activities

- **d160 Focusing attention.** Intentionally focusing on specific stimuli, such as by filtering out distracting noises
- **d161 Directing attention.** Intentionally maintaining attention to specific actions or tasks for an appropriate length of time
- **d166 Reading:** Performing activities involved in the comprehension and interpretation of written language (e.g. books, instructions, newspapers in text or Braille), for the purpose of obtaining general knowledge or specific information
- **d170 Writing:** Using or producing symbols or language to convey information, such as producing a written record of events or ideas or drafting a letter
- ...

Relating ICF items to diagnoses

ICF Items	Dementia	Alzheimer's	Down Syndr	Aphasia	Speech and Autism	ADHD	Dyslexia
ICF functions							
d160 Focusing attention	X	X	X	X	-	X	X
d161 Directing attention	-	-	-	-	-	X	-
d163 Thinking	X	X	X	X	-	X	-
d166 Reading	X	X	X	X	X	X	X
d170 Writing	X	X	-	X	X	X	X
d172 Calculating	X	X	-	X	-	X	X
d175 Solving Problems	X	X	-	X	-	X	-
d1750 Solving simple problems	X	X	-	-	-	X	X
d1751 Solving complex problems	X	X	-	-	-	X	X
d177 Making decisions	X	X	-	-	-	X	X
Activities and participation: General tasks and demands							
d210 Undertaking a single task	X	X	-	X	-	X	X
d2100 Undertaking a simple task	X	X	-	-	-	-	-
d2101 Undertaking a complex task	X	X	-	-	-	X	-
d2102 Undertaking a single task independently	X	X	-	-	-	-	-
d2103 Undertaking a single task in a group	X	-	-	-	-	X	X
d220 Undertaking multiple tasks	X	-	-	X	-	X	X

User needs (work in progress)

- Derived from **ICF activities**
 - And some ICF functions
- **Examples** (early work)
 - **Usage with limited ability to focus attention.** Some users need an environment in which there are no stimuli unrelated to their current task
 - (d160 Focusing attention)
 - **Usage with limited ability to direct attention.** Some users need specific support for maintaining attention on their current task
 - (d161 Directing attention)
 - **Usage with limited ability to shift attention.** Some users need strong and multimodal stimuli to shift their attention from one task to another
 - (b1401 Shifting attention)

Step 3: Developing guidelines

- Guidelines are being developed and will be published in **DEG 203 350**
 - for enabling or facilitating the use of mobile technologies by people with specific functional user needs,
 - regardless of which cognitive impairments (diagnoses) the individual guidelines are associated with
- **Process**
 - Collected from existing literature and best practice
 - Where there are several existing guidelines covering the same user need a new merged guideline will be created
 - In the absence of existing guidelines, they will be developed

ETSI STF 488: current status

Status so far

- Very early drafts of both the DTR and the DEG
- Identification of cognitive disabilities (diagnoses) under the scope of the work
- Preparation of fact sheets for each cognitive impairment
- Adding ICF functions and activities to each fact sheet
- Mapping of ICF functions and activities to disabilities (matrix)
- Drafting of some user needs and guidelines
- Workshop in Stockholm (2015-09-02) to validate the approach

Workshop in Stockholm

- Developing Guidelines to Allow People With Cognitive Disabilities to Exploit the Potential of Mobile ICT
 - September, 2nd
 - At the Swedish agency for participation
- Goals
 - To present the work and approach of STF 488
 - To validate the approach
 - To work on diagnosis/ICF/user needs/guidelines (exercise)

Results of the Workshop

- **Approach was validated** by external experts
 - Suggestion to focus on ICF more than diagnoses
 - Suggestion to focus on ICF activities rather than functions
- **Input** received during exercise
 - ICF activities and functions to be added/deleted
 - Suggestions for some user needs and guidelines
 - Pointers to relevant sources of information

ETSI STF 488: future work

Next steps

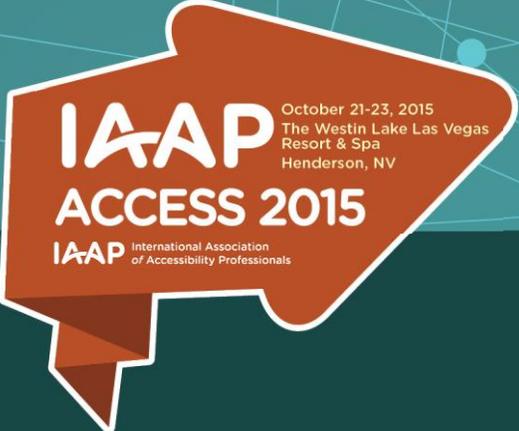
- Development of “User needs” based on groups of ICF activities and functions
- Gathering and development of some initial guidelines
- Mapping guidelines to “user needs”

- ... To become part of public drafts of EG and TR

We need your help!!

- Virtual community of persons with interest in cognitive impairments and mobile ICT
- A Reference Group of experts to support our work
- Comments to public drafts
- 2016 Workshop (under preparation)
 - May, 11th
 - Stockholm

- **Interested?**
 - Web page:
https://portal.etsi.org/STFs/STF_HomePages/STF488/STF488.asp
 - Team leader: Mike Pluke (Mike.Pluke@castle-consult.com)



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Thank you!!!

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The graphic features a dark teal background with a network of light blue lines and nodes. A large, stylized orange arrow points from the left towards the center. Two circular icons are visible: one with two speech bubbles and another with a microphone.