Coordination Action in R&D in Accessible and Assistive ICT

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CARDIAC

Coordination Action in R&D in Accessible and Assistive ICT

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What type of research is missing that could facilitate development of inclusive HCI?

A Structured Dialogic Design co-laboratory

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Executive Summary

The aim of this deliverable is to report on the second Structured Dialogic Design Process (SDDP-2) of the CARDIAC Coordination Action, which was held in San Sebastian between 28th-29th of June 2011, and before and after virtually, on the theme "What type of research is missing that could facilitate development of inclusive HCI?"

The report describes the consultation phases leading up to the event, the two-day co-laboratory itself as well as the three virtual sessions held after the meeting in San Sebastian. An initial analysis of the results and influence tree is presented. These results and the resulting influence tree will be taken up and further analyzed in the context of WP3 and will form part of the overall analysis and roadmap to be drawn up in Deliverable 3.2 "Trends on inclusive user interface design " due in month 36 (advance draft submitted for 24-month review).

Partner UPV/EHU was responsible for the organization of the SDDP as leader of WP3 and partner CNTI was responsible for its implementation as leader of WP2.

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Further information can be found at www.cardiac-eu.org and http://csiiidevelopment.wikispaces.com

1. Introduction

The main aim of the coordination action CARDIAC is to generate research agenda roadmaps and a technology transfer roadmap using the SDDP methodology.

This deliverable reports on the second such SDDP co-laboratory on the theme of inclusive HCI research in response to the specific triggering question of "What type of research is missing that could facilitate development of inclusive HCI?"

A list of relevant stakeholders was drawn up several months before the meeting and representatives from the identified stakeholders were invited to participate. The final number of participants was 21 (thirteen from the consortium and eight external participants). The ideal number of participants in such SDDP events is between 20-25 so the number of participants is within this prescribed range. Table 1 below (on the next page) indicates the areas of expertise of the participants and contributors to the Wiki according to the identified list of stakeholders (columns). It can be seen that each of the identified stakeholder categories/areas of expertise is covered by at least two of the participants. A full list of the participants along with brief descriptions is given in Annexe II.

The background information setting the context for the Triggering Question with a view of bringing the participants to a common understanding of the issue has been provided in deliverable D3.1 "Report with background material needed to support SDDP-2 Meeting" (submitted at the previous interim review) and via the CARDIAC Wikispace: http://userinteraction-sdd-cardiac.wikispaces.com/). This deliverable will therefore focus essentially on phase 5 of the process, i.e.:

- Collection and clarification of the ideas received in response to the triggering question
- Clustering of the responses
- Results of the voting by participants
- Structuring of the responses through exploration of the links between mechanisms
- Presentation and initial analysis of the resulting influence tree.

The face-to-face part of the event lasted two days and was held between the 28-29th of June 2011 in San Sebastian, Spain. Two weeks ahead of the meeting the twenty-one participants were given the opportunity of submitting their initial responses to the Triggering Question via the CARDIAC Wikispace. Three remote sessions were then held after the meeting to complete the structuring using the software Elluminate Live™. The CARDIAC Wikispace was also used to gather further clarifications and analysis of the results. The Wiki also contains recorded videos of the participants presenting their ideas and contributions.

A further in-depth analysis of the results will be carried out in the context of WP3 and included in deliverable D3.2 "Trends on inclusive user interface design" due in month 36 (advance draft submitted for 24-month review).

Participants	Users/User organisations	Human factors specialists	Researchers	Mainstream ICT developer	Assistive ICT developers	SME ICT	Educational & Training Organisations	Standardisation & Regulatory bodies	Government Agencies	Service delivery actors
Jon Aspiroz		x	x	x						
Stephan Carmien		x	x		x					
Ginger Claasen	x	x	x	x	x					
Simon Harper		x	x				x	x		
Adamantios Koumpis			x			x				
Roberto Torena	x	x	x							
Prof. Gregg Vanderheiden		x	x				x	x	x	
Prof. Gerhard Weber		x	x		x		x	x		
Prof. Julio Abascal		x	x				x			
Gunela Astbrink		x						x	x	
Ilse Bierhoff		x		x	x	x				x
Ass. Prof. Kjell Åge Bringsrud		x	x				x			
Prof. Pier Luigi Emiliani		x	x				x			
Prof. Cristina Espadinha		x	x				x			
Rocio Garcia Robles		x	x				x			
Dr. John Gill	x	x		x	x			x		
Dr. Ing Helmut Heck		x	x		x					x
Sifis Klironomos		x	x		x		x			
Prof. Leonor Moniz Pereira		x	x				x			
Mary Nolan	x	x			x		x			x
Patrick Roe			x		x		x			
Contributors to Wiki										
Steve Tyler	x	x		x	x					
Edward Chandler	x	x		x	x					
Robert Hecht								x	x	
Tim Pennick	x	x		x						

Table 1. Areas of expertise of participants

2. Background information on Structured Dialogic Design

The Science of Structured Dialogic Design is a deeply reasoned, rigorously validated methodology for dialogic design, which integrates knowledge from mixed participants in strategic design settings. It is especially effective in resolving multiple conflicts of purpose and values and in generating consensus on organizational and inter-organizational strategy.

Structured Dialogic Design can be seen as a branch of systems sciences with applications in social sciences with its roots in cybernetics, application of systems sciences in social contexts and the science of complex systems, which emerged in the early 1970s. Dr John Warfield is credited with the application of the principle of Interpretive Structural Modelling in the analysis of complex socioeconomic systems, which became a major consensus method in the application of SDD. It was however, Dr. Aleco Christakis and his group that are credited for the formulation of the science of Structured Dialogic Design in its present form.

During the past decade, we have witnessed an exponential growth in the number of dialogues organized using what is known as the *science of structured dialogic design.* An increasing number of facilitators, workshop organizers, participants, scientists, and lay people show great interest in learning more about this science.

The Cyprus Neuroscience and Technology Institute has a long history and experience using this methodology in a range of domains, from education to civil conflict and have in the past utilized the process to great effect in two COST Actions (COST 298 and COST 219ter).

3. Missing research that could facilitate development of inclusive HCI

Following a two-month consultation with the stakeholders via the Cardiac Wikispace1, the following Triggering Question was formulated:

What type of research is missing that could facilitate development of inclusive HCI?

The consultation was put in place in order to prepare participants for the SDDP meeting, inform them about the methodology[2] and encourage them to begin thinking about their contributions. 56 responses were formulated on the Wikispace ahead of the meeting, some of which came from people who were not able to attend the meeting itself. The full list of these ideas can be found in Annexe III where they are listed in the order that they were posted on the Wikispace, with the same reference #numbers as on the Wiki. Many of these ideas then made it to the influence tree and the full list of 75 ideas, collected before and during the meeting, is given in Annex 1, along with the corresponding clarifications.

During the second SDD[SM] the CARDIAC partners and participants engaged for two days in a structured dialogue focusing on the above mentioned Triggering Question. The Lead facilitator of the SDD[SM], Dr. Yiannis Laouris, served as the person coordinating the process. Cogniscope[3] operator was Mrs. Georgina Siitta-Achilleos. There were 22 people participating in this SDD[SM], one of whom participated through videophone.

Three remote sessions were held after the meeting to complete the structuring using the software Elluminate Live™ on the 6th of July, 1st of August, and the 7th of September 2011, taking around two hours per session. This web conferencing program was developed by Elluminate Inc. to implement synchronous events[4]. Elluminate "rents" out virtual rooms or vSpaces where virtual schools and businesses can hold classes and meetings. This virtual space was the means by which all participants got together in order to be able to work on the virtual SDD℠. The image of the SDD℠ software Cogniscope™ could be viewed by all remote participants; functions such as raising hand, voting "yes" or "no", video, and chatting made this virtual SDD℠ possible. A screen-shot of this environment is shown in the next image. A video clip of the process is available on-line[5]. On the 6th of July facilitators were Dr. Yiannis Laouris and Mrs. Georgina Siitta-Achilleos. On the 1st of August facilitators were Dr. Yiannis Laouris and Ms. Tatjana Taraszow, and on the 7th of September facilitation was carried out by Ms. Tatjana Taraszow.

The participants of the co-laboratory shared 75 ideas/mechanisms in response to the triggering question. Each idea appears with a detailed explanation in Table 1 - Ideas with Clarifications.

During the following stage, the participants categorized their ideas, in the following clusters:

Cluster 1: **Beyond HCI**
Cluster 2: **Cognitive Interaction**
Cluster 3: **Innovative User Interfaces**
Cluster 4: **Accessibility resource materials**
Cluster 5: **Adaptive User Interfaces**
Cluster 6: **Methodologies**
Cluster 7: **Knowledge sharing**
Cluster 8: n/a
Cluster 9: n/a
Cluster 10: **Universal Remote Console**
Cluster 11: **Ubiquitous Computing**
Cluster 12: **Simplification**
Cluster 13: **Social Interaction**
Cluster 14: **Human Factors**
Cluster 15: n/a
Cluster16: **Research on adoption of accessibility**
Cluster 17: **User profiles**
Cluster 18: **Design Tools**

4. Cluster List

Cluster 1: Beyond HCI
1: Research to get rid of HCI [Pier-Herjan]
8: To do research on tangible artifacts to promote e-inclusion of people with special needs in technologically mediated environment [Rocio]
16: New interaction metaphors and paradigms for computing [Adamantios]
19: Research on inclusive user-interaction in ambient intelligence environments [Sifis]
21: Consider not only the interface as it appears but the entire interaction dialogue [Pier]
39: Promote ubiquitous computing and programming tools [Sifis-Eddie]
43: Identify where research is needed to obtain universal access in ambient intelligence environments [Kjell]

Cluster 2: Cognitive Interaction
2: Research aiming at avoiding cognitive barriers in the design of Human Machine Interfaces [Helmut]
32: Support research that looks how to reduce the complexity of user interaction whilst retaining functionality [Patrick]
45: Research on the cognitive load associated with various user interfaces [John]
65: Interface design - knowledge of computer paradigms (Steve)
66: Interface design: input and output [Steve]

Cluster 3: Innovative User Interfaces
3: Development of new haptic interfaces and methods for haptic usability [Kjell-Gerhard]
13: Support research on novel human-machine interfaces for recreational activities [Patrick-Sifis]
23: Development of sophisticated brain-computer interfaces for people with special needs [Kjell]
31: Promote research into the cost of eye-tracking and tongue piercing based interfaces [Mary]
36: Non-visual interfaces for all (mainstreaming of non visual computing) [Adamantios]
44: Accessible telecommunications technologies for people with no or little speech [Gunela]
72: Dynamic composition complex interfaces (mash-up of services) [Roberto]
73: Accessibility of IPv6 enabled consumer appliances [Gunela]
74: Support research on accessible interaction with robots [Patrick]

Cluster 4: Accessibility resource materials
4: Design clearing house for inclusive HCI [Gunela]
10: Facilitate the creation of digital accessible materials to non accessibility experts [Cristina]
26: To develop more specific and clear accessibility guidelines for application developers [Jon]
34: Research on how to enforce accessibility in consumer goods [Ginger]
54: Research on how to increase and widen accessibility in professional education [Ginger]
60: To promote common research on user needs and preferences to be used by all e-inclusion projects [Jon]
61: Ways to move from purchase to lease or renting accessibility and assistive technology (exploring market, policy and technology challenges) [Gregg-Adamantios]

Cluster 5: Adaptive User Interfaces
5: Development of practical adaptive user interfaces [John]
6: Research of the use of context awareness to adapt user interfaces [Jon]
9: To promote research that closes the gap between interfaces for inclusion [Leonor]
15: Delivery of the interface - based on personalization, customization, adaptation and open APIs (such as REST) - to many more varied platforms [Simon-RobertH]
22: Support the research in detecting the behaviour, emotions and intentions of the user without the conscious control by the user [Helmut]
35: Support research on how affective computing can assist accessibility interfaces [Simon-Mary]
41: Use reasoning (AI) techniques for personalization [Pier]
50: Promote research on inclusive HCI for highly dynamic impairments [Ilse]

Cluster 6: Methodologies
7: Promote research in methodologies and tools for HCI accessibility evaluation, including, monitoring and benchmarking [Julio-Gerhard]
29: Research methodologies that efficiently collect data about users including existing HCI quantitative tools (like needs, skills, interests, limitations) [Cristina]
47: Research on methodologies to analyse collaborative accessibility and undertake collaborative user- and usage centred design [Rocio-Gerhard]
63: Research on automated evaluation aids [Gregg]

Cluster 7: Knowledge Sharing
69: New mechanisms for international collaborations [Gregg]
71: Research on sharing accessibility knowledge with developing countries [Gerhard]

Cluster 8:
11: Promote tools for decision making in the user-centred design process [Ilse]

Cluster 9:
12: Promote research on the role of inclusive HCI to support self-management in health care [Mary]
20: Create a paradigm that avoids the traps of either forcing all to use a single new technology or for all content to be rewritten (interesting to study the growth of the web) [Stefan]
53: Research into how AT can provide better than typical results (e.g. cyber-human) [Stefan]

Cluster 10: Universal Remote Console
14: Develop and enforce standardized and harmonized remote HCIs [Ginger-Tim]
27: To do research on how to use mobile technologies as a universal middleware in public and private environments [Rocio]
46: Promote interoperability among devices and services to enhance accessibility [Julio]

Cluster 11: Ubiquitous Computing
17: Research and development on provision of accessible interfaces inclusive products and services in an ubiquitous manner [Roberto]

Cluster 12: Simplification
62: Digital literacy stepping stones [Gregg]
70: Research on how to make accessibility simpler to deliver, apply, configure, support and use and explain to policy makers [Gregg]

Cluster 13: Social Interaction
30: Make social media inclusive [Ilse]

Cluster 14: Human Factors
24: Training programs for disability representatives to effectively participate in R & D processes [Gunela]
25: Research on who could be excluded from using novel user interfaces [John]
28: Research about the exclusion that has been created by HCI [Leonor]
38: Research on mid to long term interaction by disabled and elderly people [Gerhard]
40: Promote methodologies to include the human diversity in user interface design [Julio]
48: Create a meaningful use of HCI clearly supporting activities [Leonor]
49: Research that promotes inclusive practices of professionals responsible to develop new products or services [Cristina]
52: Support research on the implications for people with disabilities of the use of biometric systems for identification and security [Patrick]
55: Identify human factors barriers to health, education and participation of low income groups [Simon]
64: Basic research needs to be made on AT abandonment/adoption [Stefan]
67: Usable accessibility [Steve]

Cluster 15:
37: R&D on text normalization, simplification, personalization and evaluation [Roberto]

Cluster 16: Research on adoption of accessibility
42: Research on reasons why existing knowledge and standards on accessibility are not known or applied by HCI developers [Helmut]

Cluster 17: User profiles
57: Further research on static and adaptive user interaction profiles [Roberto]

Cluster 18: Design Tools
75: Create development environment for accessibility solutions [Gregg]

After having clustered all their ideas, the participants cast votes for the five ideas that they each felt were most important.

The following ideas received votes:

19: *(5 Votes)* Research on inclusive user-interaction in ambient intelligence environments [Sifis]

32: *(5 Votes)* Support research that looks how to reduce the complexity of user interaction whilst retaining functionality [Patrick]
15: *(4 Votes)* Delivery of the interface - based on personalization, customization, adaptation and open APIs (such as REST) - to many more varied platforms [Simon-RobertH]
52: *(4 Votes)* Support research on the implications for people with disabilities of the use of biometric systems for identification and security [Patrick]
61: *(4 Votes)* Ways to move from purchase to lease or renting accessibility and assistive technology (exploring market, policy and technology challenges) [Gregg-Adamantios]
63: *(4 Votes)* Research on automated evaluation aids [Gregg]
69: *(4 Votes)* New mechanisms for international collaborations [Gregg]
2: *(3 Votes)* Research aiming at avoiding cognitive barriers in the design of Human Machine Interfaces [Helmut]
7: *(3 Votes)* Promote research in methodologies and tools for HCI accessibility evaluation, including, monitoring and benchmarking [Julio-Gerhard]
14: *(3 Votes)* Develop and enforce standardized and harmonized remote HCIs [Ginger-Tim]
35: *(3 Votes)* Support research on how affective computing can assist accessibility interfaces [Simon-Mary]
40: *(3 Votes)* Promote methodologies to include the human diversity in user interface design [Julio]
41: *(3 Votes)* Use reasoning (AI) techniques for personalization [Pier]
44: *(3 Votes)* Accessible telecommunications technologies for people with no or little speech [Gunela]
64: *(3 Votes)* Basic research needs to be made on AT abandonment/adoption [Stefan]
71: *(3 Votes)* Research on sharing accessibility knowledge with developing countries [Gerhard]
3: *(2 Votes)* Development of new haptic interfaces and methods for haptic usability [Kjell-Gerhard]
4: *(2 Votes)* Design clearing house for inclusive HCI [Gunela]
6: *(2 Votes)* Research of the use of context awareness to adapt user interfaces [Jon]
10: *(2 Votes)* Facilitate the creation of digital accessible materials to non accessibility experts [Cristina]
11: *(2 Votes)* Promote tools for decision making in the user-centred design process [Ilse]
13: *(2 Votes)* Support research on novel human-machine interfaces for recreational activities [Patrick-Sifis]
21: *(2 Votes)* Consider not only the interface as it appears but the entire interaction dialogue [Pier]
27: *(2 Votes)* To do research on how to use mobile technologies as a universal middleware in public and private environments [Rocio]
29: *(2 Votes)* Research methodologies that efficiently collect data about users including existing HCI quantitative tools {Cristina]
45: *(2 Votes)* Research on the cognitive load associated with various user interfaces [John]
46: *(2 Votes)* Promote interoperability among devices and services to enhance accessibility [Julio]
47: *(2 Votes)* Research on methodologies to analyse collaborative accessibility and undertake collaborative user- and usage centred design [Rocio-Gerhard]
57: *(2 Votes)* Further research on static and adaptive user interaction profiles [Roberto]
72: *(2 Votes)* Dynamic composition complex interfaces (mash-up of services) [Roberto]
1: *(1 Votes)* Research to get rid of HCI [Pier-Herjan]
5: *(1 Votes)* Development of practical adaptive user interfaces [John]
12: *(1 Votes)* Promote research on the role of inclusive HCI to support self-management in health care [Mary]
17: *(1 Votes)* Research and development on provision of accessible interfaces inclusive products and services in an ubiquitous manner [Roberto]
20: *(1 Votes)* Create a paradigm that avoids the traps of either forcing all to use a single new technology or for all content to be rewritten (interesting to study the growth of the web) [Stefan]
23: *(1 Votes)* Development of sophisticated brain-computer interfaces for people with special needs [Kjell]
25: *(1 Votes)* Research on who could be excluded from using novel user interfaces [John]
28: *(1 Votes)* Research about the exclusion that has been created by HCI [Leonor]
31: *(1 Votes)* Promote research into the cost of eye-tracking and tongue piercing based interfaces [Mary]
34: *(1 Votes)* Research on how to enforce accessibility in consumer goods [Ginger]
36: *(1 Votes)* Non-visual interfaces for all (mainstreaming of non visual computing) [Adamantios]
37: *(1 Votes)* R&D on text normalization, simplification, personalization and evaluation [Roberto]
38: *(1 Votes)* Research on mid to long term interaction by disabled and elderly people [Gerhard]
39: *(1 Votes)* Promote ubiquitous computing and programming tools [Sifis-Eddie]
48: *(1 Votes)* Create a meaningful use of HCI clearly supporting activities [Leonor]
49: *(1 Votes)* Research that promotes inclusive practices of professionals responsible to develop new products or services [Cristina]
54: *(1 Votes)* Research on how to increase and widen accessibility in professional education [Ginger]
55: *(1 Votes)* Identify human factors barriers to health, education and participation of low income groups [Simon]
70: *(1 Votes)* Research on how to make accessibility simpler to deliver, apply, configure, support and use and explain to policy makers [Gregg]
74: *(1 Votes)* Support research on accessible interaction with robots [Patrick]
75: *(1 Votes)* Create development environment for accessibility solutions [Gregg]

Out of the population of 75 proposed ideas, 50 received one or more votes. This is described scientifically by the parameter of *Spreadthink*[4] or divergence (ST or D respectively), whose value in this case is 64% of disagreement. Spreadthink is defined as (V-5) / (N-5) where N is the total number of ideas and V is the number of ideas that received one or more votes.

According to numerous studies from the literature, the average degree of Spreadthink is 50%. Therefore, in this case, the participants showed greater than average divergence in their ideas regarding the issue. This suggests that the participants captured a wide spectrum of issues therefore increasing the Spreadthink.

In order to enrich the results, i.e. identify the participants' perceived degree of importance among the twenty ideas that received one vote each a second round of voting took place. Here, the participants cast votes for the five ideas that they each felt were most important of those ideas that received one vote during the first round.

The following ideas with originally one vote received the following votes during the second voting round:

25: *(11 Votes)* Research on who could be excluded from using novel user interfaces [John]
5: *(8 Votes)* Development of practical adaptive user interfaces [John]
74: *(8 Votes)* Support research on accessible interaction with robots [Patrick]
12: *(5 Votes)* Promote research on the role of inclusive HCI to support self-management in health care [Mary]
39: *(5 Votes)* Promote ubiquitous computing and programming tools [Sifis-Eddie]
70: *(5 Votes)* Research on how to make accessibility simpler to deliver, apply, configure, support and use and explain to policy makers [Gregg]
75: *(5 Votes)* Create development environment for accessibility solutions [Gregg]
23: *(4 Votes)* Development of sophisticated brain-computer interfaces for people with special needs [Kjell]
54: *(4 Votes)* Research on how to increase and widen accessibility in professional education [Ginger]
34: *(3 Votes)* Research on how to enforce accessibility in consumer goods [Ginger]
36: *(3 Votes)* Non-visual interfaces for all (mainstreaming of non visual computing) [Adamantios]
31: *(2 Votes)* Promote research into the cost of eye-tracking and tongue piercing based interfaces [Mary]
55: *(2 Votes)* Identify human factors barriers to health, education and participation of low income groups [Simon]
1: *(1 Votes)* Research to get rid of HCI [Pier-Herjan]
20: *(1 Votes)* Create a paradigm that avoids the traps of either forcing all to use a single new technology or for all content to be rewritten (interesting to study the growth of the web) [Stefan]
28: *(1 Votes)* Research about the exclusion that has been created by HCI [Leonor]
37: *(1 Votes)* R&D on text normalization, simplification, personalization and evaluation [Roberto]
48: *(1 Votes)* Create a meaningful use of HCI clearly supporting activities [Leonor]

The results of both voting procedures were used in order to select ideas for the following structural process. The participants were able to structure 33 out of the 50 ideas that received votes. This includes all ideas that received two and more votes (30 ideas) plus those ideas that initially received one vote and received the most votes during the second voting cast (3 ideas). The resulting "Tree of Influences" demonstrates the most influential ideas, i.e. those, which have the greatest impact. The tree is made up of 5 levels of influence, 33 ideas and 101 connections.

5. Tree of Influences

The 'Tree of Influences' is made up of 5 different levels. Only one idea is cycled together with another (32 and 41 on level V). This means that this pair of ideas was found to influence each other, to receive and to exert influences from and to the same factors. Two other ideas (10 and 72) were found to have no links with any other of the ideas and are therefore not connected to the rest of the influence map.

It is also interesting to note the location of the various ideas according to the amount of votes received. Table 1 below shows the detailed distribution of the number of ideas according to the number of votes (lines) and level in influence tree (column).

Number of Votes	Level 1	Level 2	Level 3	Level 4	Level 5
4 & 5	2	3	0	0	2
3	3	1	3	1	1
1&2	3	4	1	5	2

Table 1. Distribution of ideas according the number of votes received and level in influence map.

The first observation is that there seems to be a tendency for the ideas that received the most votes (4 and 5 votes) to be either at the foot (level 5) or the top of the influence tree (levels 1 and 2). This can be explained by the observation that proposals that receive the most votes often tend to be either 'visionary' ideas that encapsulate widely held aspirations or more practical ideas that encapsulate clearly identifiable issues that need to be addressed as a matter of urgency.

It can be seen from this table that no clear pattern emerges for the ideas that received 1, 2 and 3 votes, where the distribution is spread fairly evenly across all 5 levels.

This seems to indicate then that the overall distribution in terms of number of votes is fairly random with the distribution being more related to the type of idea than the number of votes cast, where the more practical ideas tending to be located towards the foot of the table with the more long-term 'visionary' ideas tending to be more towards the top of the influence map. This can be explained by the fact that the ideas that manage to encapsulate widely held aspirations, expressing the ultimate collective aim or vision may well require other more practical issues to be resolved before they can be achieved and thus find themselves towards the top of the influence tree.

The more practical ideas, which may or may not have received the most votes, are often located towards the foot of the influence map (levels IV-V). These ideas have the greatest degree of influence. This phenomenon is known as erroneous priorities effect.

Ideas are structured into the influence map and connected to other ideas based on great majority decisions. Specifically, the participants were asked to explore influences between two ideas. They were asked to discuss and decide whether working on one idea will make working on another idea significantly easier. If the great majority of participants ($\geq$75%) think one idea has a significant influence on another idea a connection between those ideas is established in the influence map indicating the direction of the influence.

During the remote follow-up sessions the facilitation team required a unanimous majority (100%) for decisions regarding influences so as to adjust for the lower number of participants.

The collective wisdom of the participants revealed that the following five mechanisms, which are located on level 5 at the foot of the influence tree, are probably the most influential and that the stakeholders should give these a higher priority:

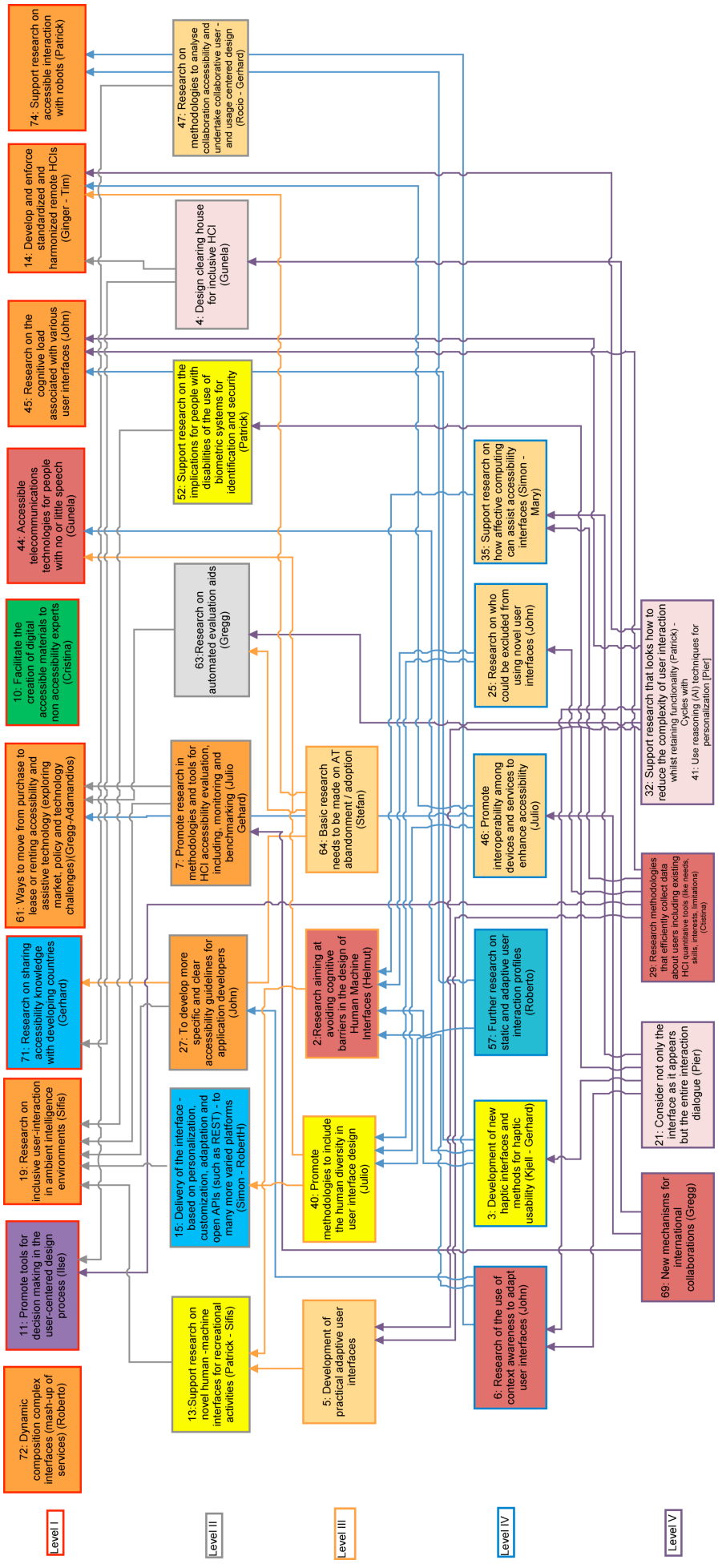
69: New mechanisms for international collaborations

21: Consider not only the interface as it appears but the entire interaction dialogue
32: Support research that looks how to reduce the complexity of user interaction whilst retaining functionality
41: Use reasoning (AI) techniques for personalization
29: Research methodologies that efficiently collect data about users including existing HCI quantitative tools (like needs, skills, interests, limitations)

The importance and influence of these five ideas is graphically illustrated by the 16 sub-influence maps for the ideas in levels 1 and 2 shown in this report after the main influence tree. All but one of these sub-influence maps, contain at least one of these five factors in the corresponding sub-influence tree. The only exception is idea #47. These five factors will therefore have a direct or indirect impact on the great majority of ideas in the influence tree.

The reason for extracting these sub-influence maps is not only to illustrate the influence that these five factors at the foot of the influence tree have, but also to help identify the factors that can influence and have an impact on the ideas at the top two levels of the influence tree. Although this information is contained in the overall influence tree, it may not be immediately obvious and easy to extract this information. This should also help with the more in depth analysis to be carried out in deliverable D3.2.

Tables have also been included for the proposals, which received the most votes but were not situated in levels 1 or 2 (factors #2, #35, #69, #32 and #41). These tables indicate the ideas supporting these proposals and once again all the tables include at least one of the fives factors at the foot of the influence tree.


Level I
Level II
Level III
Level IV
Level V
72: Dynamic composition complex interfaces (mash-up of services) (Roberto)
11: Promote tools for decision making in the user-centered design process (Ilse)
19: Research on inclusive user-interaction in ambient intelligence environments (Sifis)
71: Research on sharing accessibility knowledge with developing countries (Gerhard)
61: Ways to move from purchase to lease or renting accessibility and assistive technology (exploring market, policy and technology challenges)(Gregg-Adamandios)
10: Facilitate the creation of digital accessible materials to non accessibility experts (Cristina)
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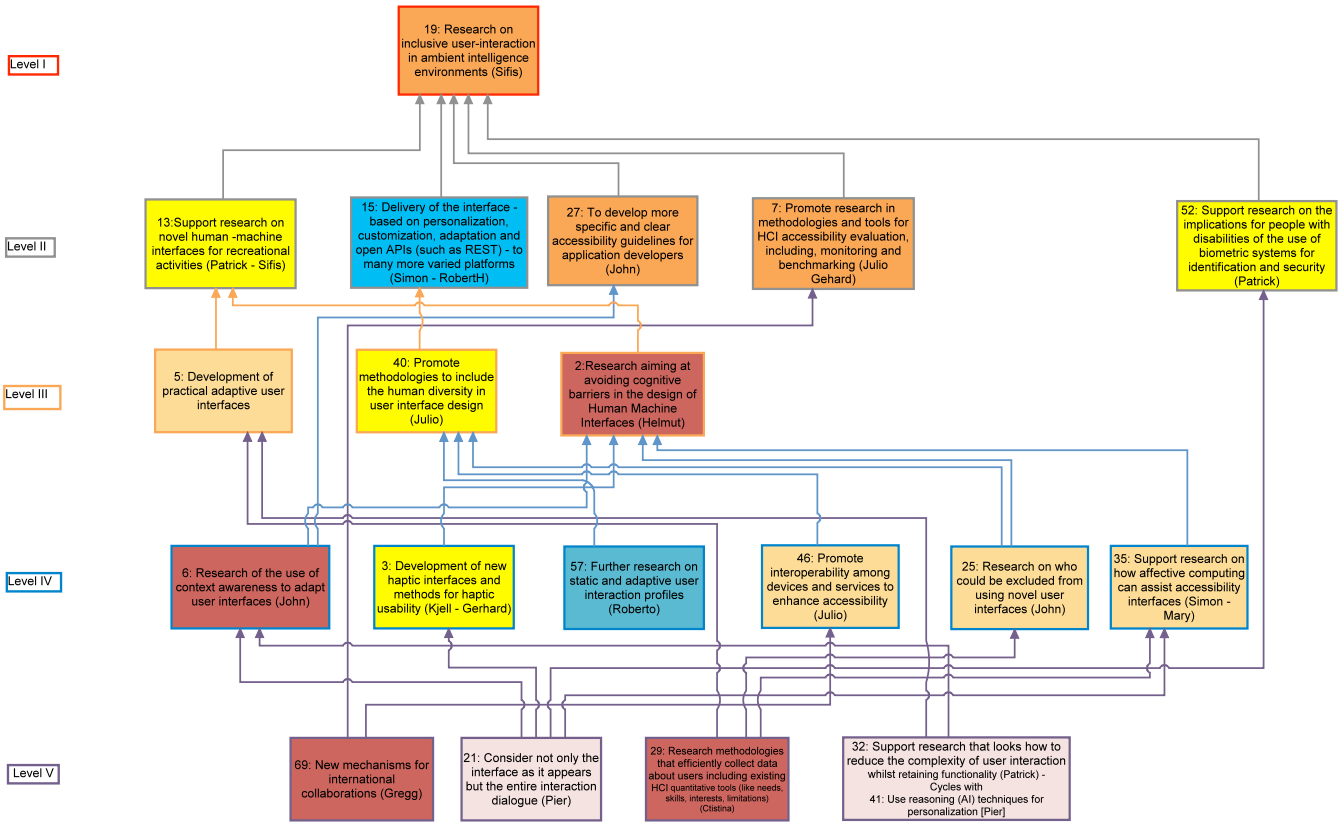
74: Support research on accessible interaction with robots (Patrick)
13:Support research on novel human -machine interfaces for recreational activities (Patrick - Sifis)
15: Delivery of the interface - based on personalization, customization, adaptation and open APIs (such as REST) - to many more varied platforms (Simon - RobertH)
27: To develop more specific and clear accessibility guidelines for application developers (John)
7: Promote research in methodologies and tools for HCI accessibility evaluation, including, monitoring and benchmarking (Julio Gerhard)
63:Research on automated evaluation aids (Gregg)
4: Design clearing house for inclusive HCI (Gunela)
47: Research on methodologies to analyse collaboration accessibility and undertake collaborative user- and usage centered design (Rocio - Gerhard)
5: Development of practical adaptive user interfaces
40: Promote methodologies to include the human diversity in user interface design (Julio)
2:Research aiming at avoiding cognitive barriers in the design of Human Machine Interfaces (Helmut)
64: Basic research needs to be made on AT abandonment / adoption (Stefan)
52: Support research on the implications for people with disabilities of the use of biometric systems for identification and security (Patrick)
6: Research of the use of context awareness to adapt user interfaces (John)
3: Development of new haptic interfaces and methods for haptic usability (Kjell - Gerhard)
57: Further research on static and adaptive user interaction profiles (Roberto)
46: Promote interoperability among devices and services to enhance accessibility (Julio)
25: Research on who could be excluded from using novel user interfaces (John)
35: Support research on how affective computing can assist accessibility interfaces (Simon - Mary)
69: New mechanisms for international collaborations (Gregg)
21: Consider not only the interface as it appears but the entire interaction dialogue (Pier)
29: Research methodologies that efficiently collect data about users including existing HCI quantitative tools (like needs, skills, interests, limitations) (Cristina)
32: Support research that looks how to reduce the complexity of user interaction whilst retaining functionality (Patrick) - Cycles with 41: Use reasoning (AI) techniques for personalization [Pier]

Tables sub-influence maps from SDDP2 in San Sebastian

Table and sub-influence map for Factor #19 (5 votes)

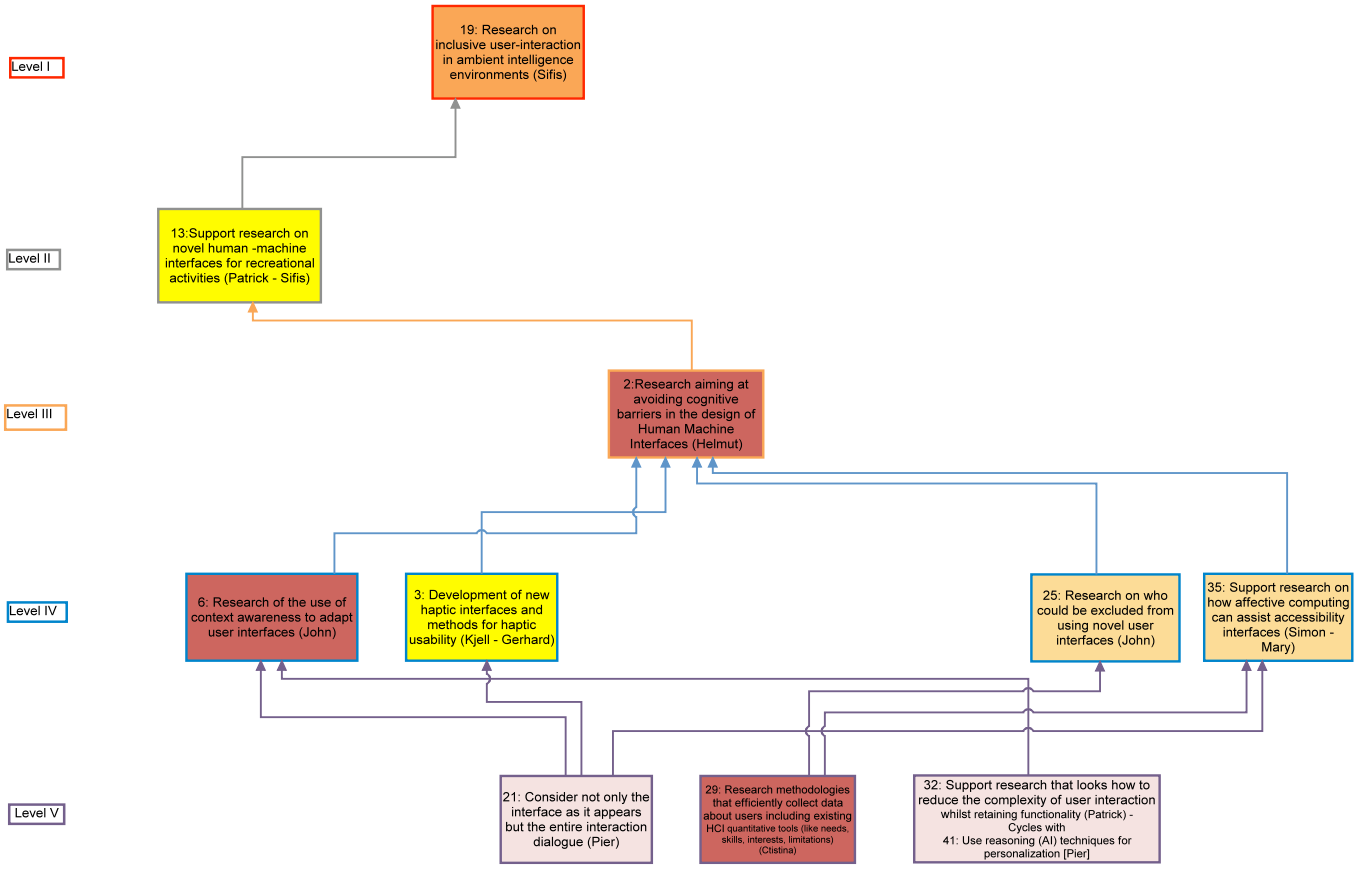
	Supported by	Supported by	Supported by	
Factor #19	#13	#5 #2	#29 #32 & #41 #3 #25 #35 #6	 #21 #29 #21 #29 #21 #32 & #41
	#15	#40	#57 #46 #25	
	#27	#6	#21 #32 & #41	
	#7	#69		
	#52	#21		



The sub-influence map for idea #19 "Support research on inclusive user-interaction in ambient intelligence environments" is a good example of a more visionary and long-term statement that would benefit and require the direct and indirect support from a number of other actions. The

sub-influence map, shows that there are in all 18 boxes containing 19 other actions that would support this visionary statement. If this topic were to form the overall aim of a particular research call, it would therefore make sense to support research in the other areas contained in this sub-influence map. For this particular example, the number of areas may be too great for a single call and it could make sense to split the process up into several calls.

One possible 'stepping-stone' could be idea #2 in the middle of the influence tree on level 3 "Support research aiming at avoiding cognitive barriers in the design of human-machine interfaces". The sub-influence map for #2 given on the next page shows the 4 actions that would directly support this factor (#6, #3, #25. #25) and the four actions that would indirectly support it (#21, #29, #32, #41).



If therefore the aim of a given FP research call were to be to avoid cognitive barriers in the design of human-machine interfaces, it would make sense to support:

- research regarding the use of context awareness to adapt user interfaces (#6)
- development of new haptic interfaces and methods for haptic usability (#3)
- research on who could be excluded from using novel user interfaces (#25)
- research on how affective computing can assist accessibility interfaces (#35)
- research that considers not only the interface as it appears but the entire interaction dialogue (#21)
- research into methodologies that efficiently collect data about users including existing quantitative tools (like needs, skills, interest, limitations) (#29)
- research that looks at how to reduce the complexity of user interaction whilst retaining functionality (#32)
- research into the use of reasoning (AI) techniques for personalization (#41).

Table for Factor #32 (5 Votes) cycled with Factor #41 (3 votes).

Factor #32 cycled with factor #41 Supports directly factors #14, #45, #6, #63 and #5

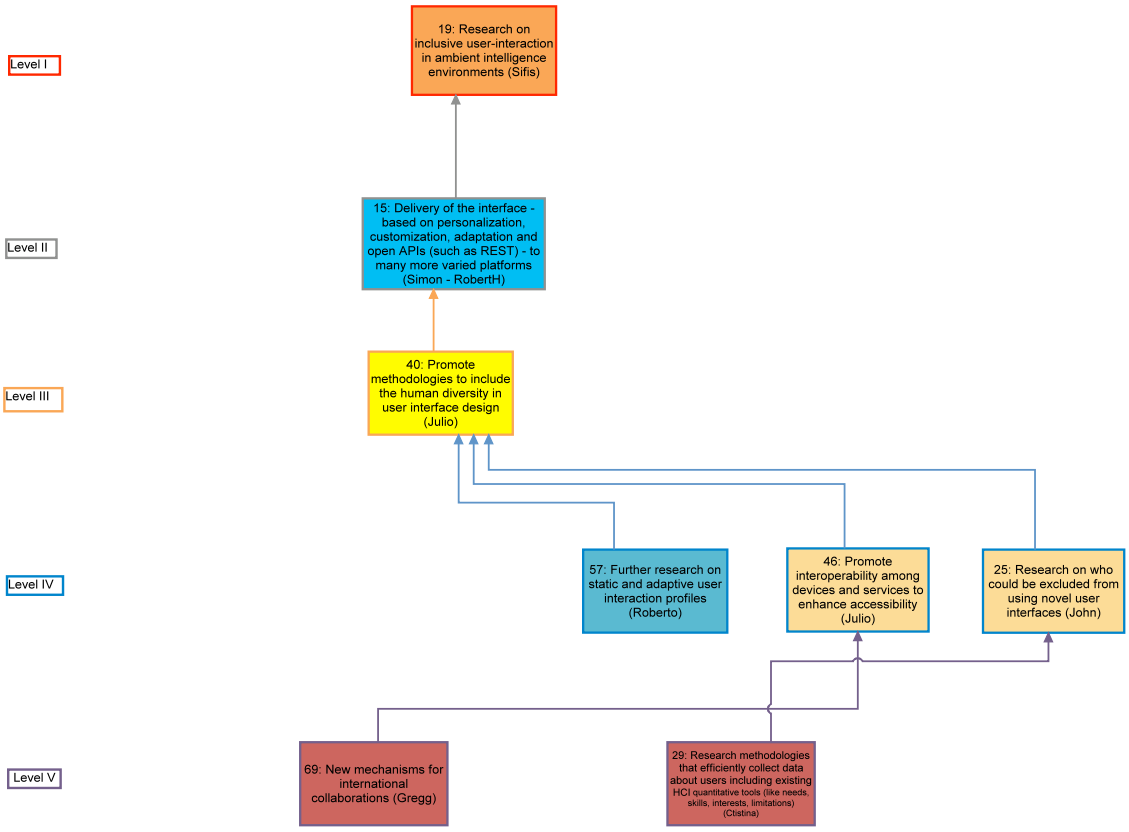
These two factors are at the root of the influence map and were considered as some of the most important factors receiving a combined total of 8 votes. These combined factors were therefore considered as a priority by the participants, both in terms of the number of votes received and the location in the influence map (level V at the foot of the influence tree). They will have a great deal of impact on a number of other actions due their location at the foot of the influence tree and should therefore be addressed as a matter of priority.

A bottom up approach would therefore suggest that priority be given to supporting research that looks into how to reduce the complexity of user interaction whilst retaining functionality (#32) along with research on the use of reasoning (AI) techniques for personalization (#41) whilst also supporting the 5 actions on which these 2 proposals will have a direct impact:

- develop and enforce standardized and harmonized remote HCI's (#14)
- support research on the cognitive load associated with various user interfaces (#45)
- support research on the use of context awareness to adapt user interfaces (#6)
- support research on automated evaluation tools (#63)
- support the development of practical adaptive user interfaces (#5).

Table and sub-influence map for Factor #15 (4 Votes)

	Supported by	Supported by	Supported by
Factor #15 Supports directly Factor #19	#40	#57 #46 #25	 #69 #29



The sub-influence map for action #15 "Delivery of the interface – based on personalization, customization, adaptation and open API's (such as REST) – to many more varied platforms" is essentially another subdivision or potential 'stepping-stone" towards the implementation of proposal #19.

So once again if the overall aim were to be to support the delivery of interfaces (based on personalization, customization, adaptation and open API's, such as REST) to more varied platforms, then it would make sense to support the following proposals:

- promote methodologies to include the human diversity in user interface design (#40)
- support further research on static and adaptive user interaction profiles (#57)
- promote interoperability among devices and services to enhance accessibility (#46)
- promote research on who could be excluded from using novel user interfaces (#25)
- instigate new mechanisms for international collaboration (#69)
- support research into methodologies that efficiently collect data about users including existing quantitative tools (like needs, skills, interests, limitations) (#29).

The next sub-influence map for factor #52 is yet another example of a sub-division of the sub-influence map for factor #19. In this case, it is a very simple sub-influence map and is self-explanatory.

Table and sub-influence map for Factor #52 (4 Votes)

	Supported by
Factor #52 Supports directly Factor #19	#21

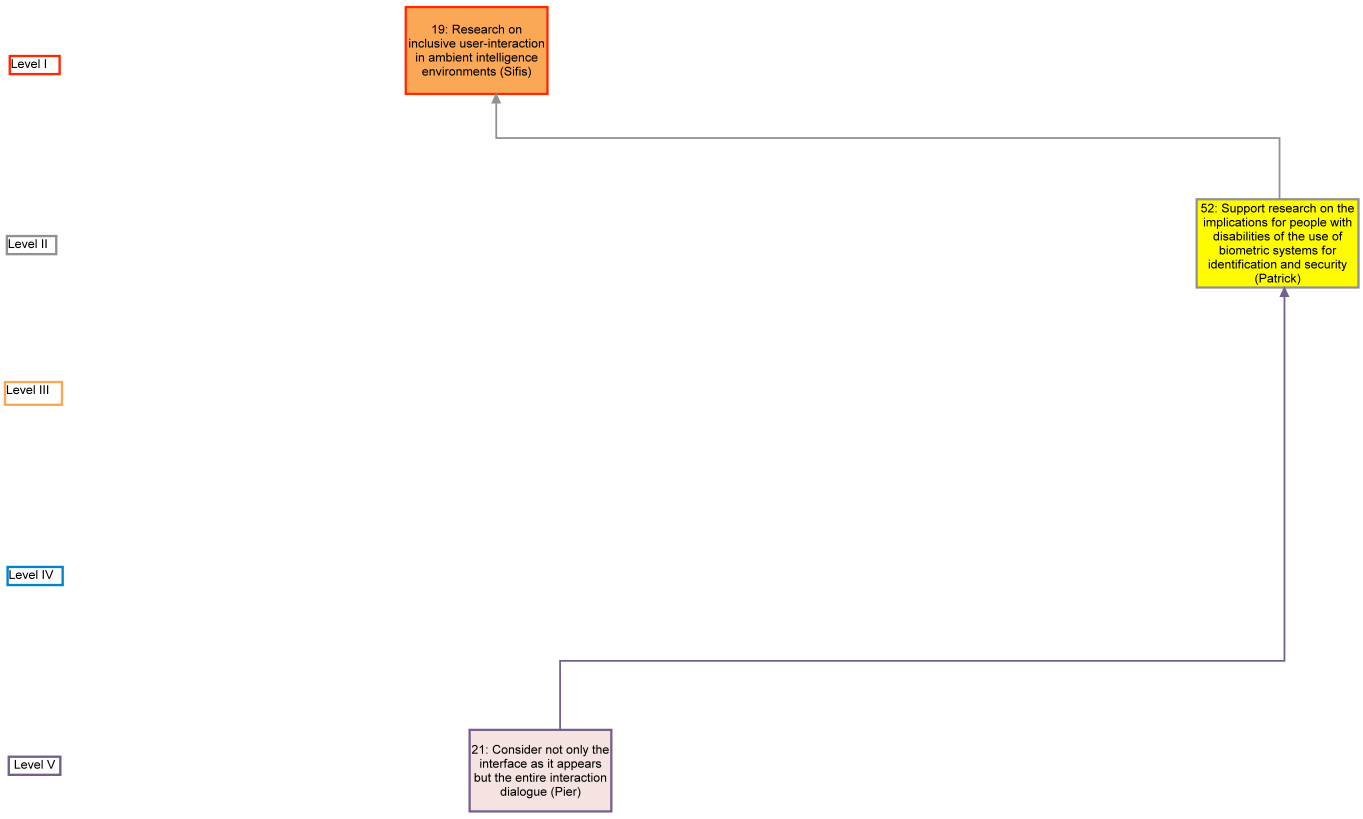
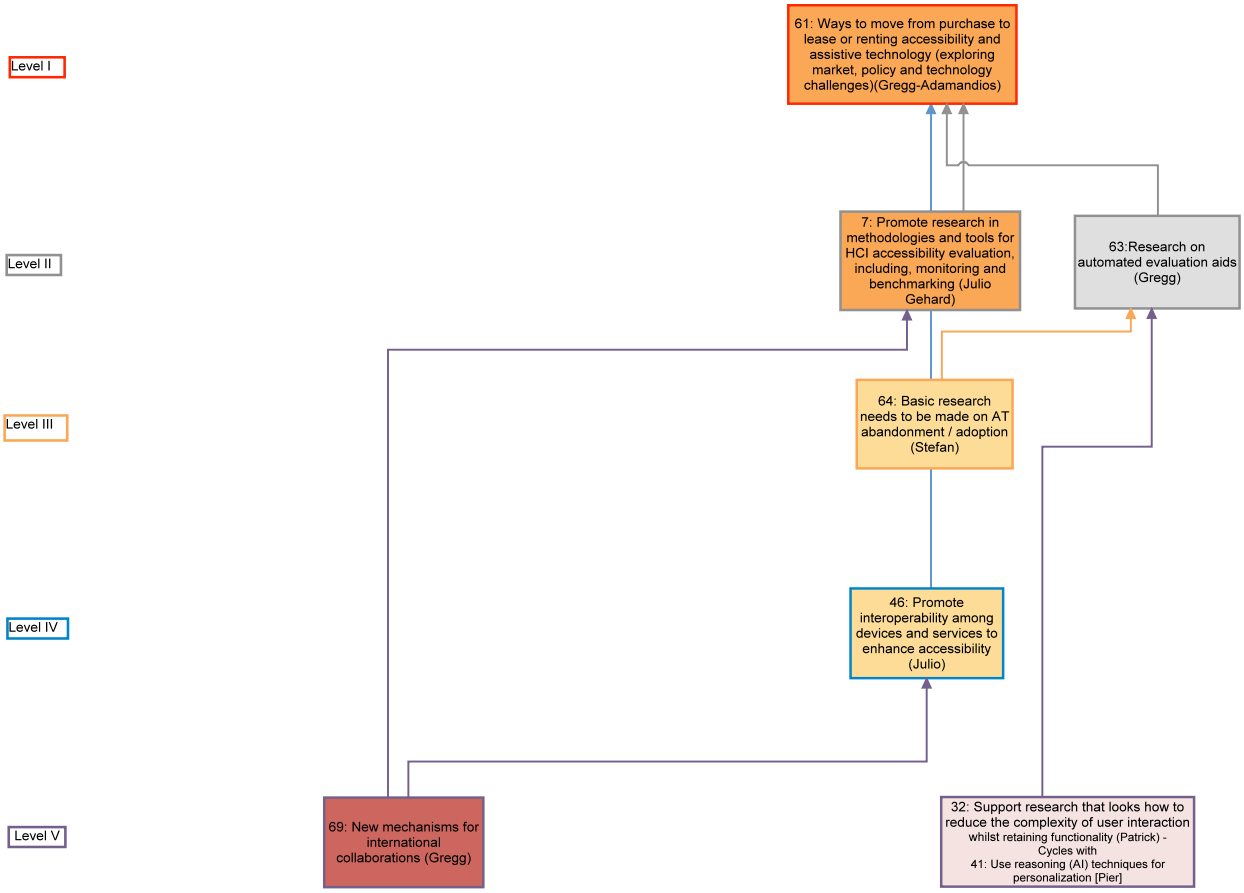


Table and sub-influence map for Factor #61 (4 Votes)

	Supported by	Supported by
Factor #61	#7 #46 #63	#69 #69 #32 & #41 #64



Factor #61 addresses a slightly different aspect and the sub-influence map contains a different combination of proposals that reflect this variation. The proposal to find ways to move from purchase lease or renting accessibility and assistive technology (exploring market, policy and technology challenges) would need to be supported in conjunction with the 7 other actions in the sub-influence map:

- promote research in methodologies and tools for HCI accessibility evaluation, including monitoring and benchmarking (#7)
- support research on automated evaluation tools (#63)
- support basic research on the reasons for AT abandonment / adoption (#64)
- promote interoperability among devices and services to enhance accessibility
- support new mechanisms for international collaboration (#69)
- support research that looks at how to reduce the complexity of user interaction whilst retaining functionality (#32)
- research into the use of reasoning (AI) techniques for personalization (#41).

The sub-influence map for factor #63 is a sub-division of the previous sub-influence map for factor #61 and could such serve as an intermediate stage or 'stepping-stone' for proposal #61.

Table and sub-influence map for Factor #63 (4 Votes)

	Supported by
Factor #63 Supports directly Factor #61	#64 #32 & #41

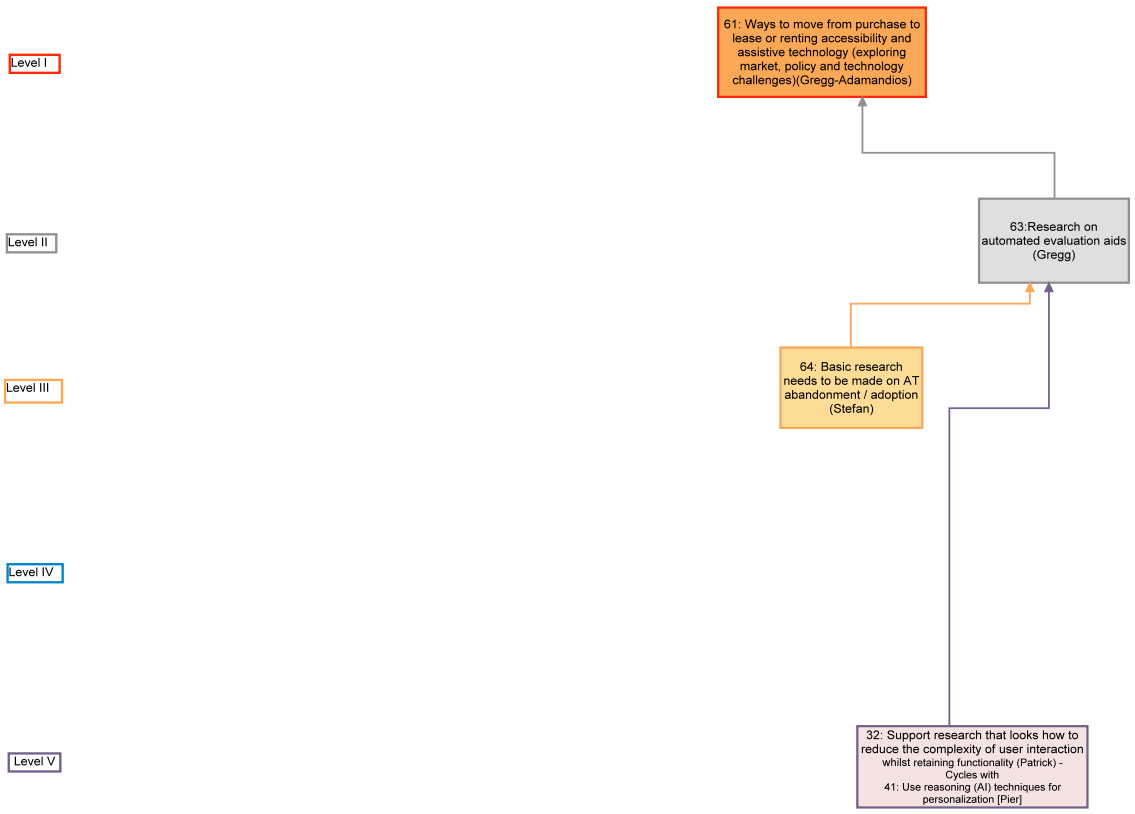


Table for Factor #69 (4 Votes).

Factor #69 Supports directly factors #7, #46, #4

This factor is at the root of the influence map. A bottom up approach would once again therefore suggest that priority be given to supporting new mechanisms for international collaboration whilst also supporting the 3 actions on which this proposal will have a direct impact:

- promote research in methodologies and tools for HCI accessibility evaluation, including, monitoring and benchmarking (#7)
- promote interoperability among devices and services to enhance accessibility (#46)
- set up a clearing house for inclusive HCI (#4).

Table and sub-influence map for Factor #7 (3 Votes)

	Supported by	Supported by
Factor #7 Directly support Factors #61 and #19	#46	#69

The next sub-influence map for factor #7 is yet another example of a sub-division of the sub-influence map for factor #19. It is another example of a fairly simple sub-influence map, which is self-explanatory.

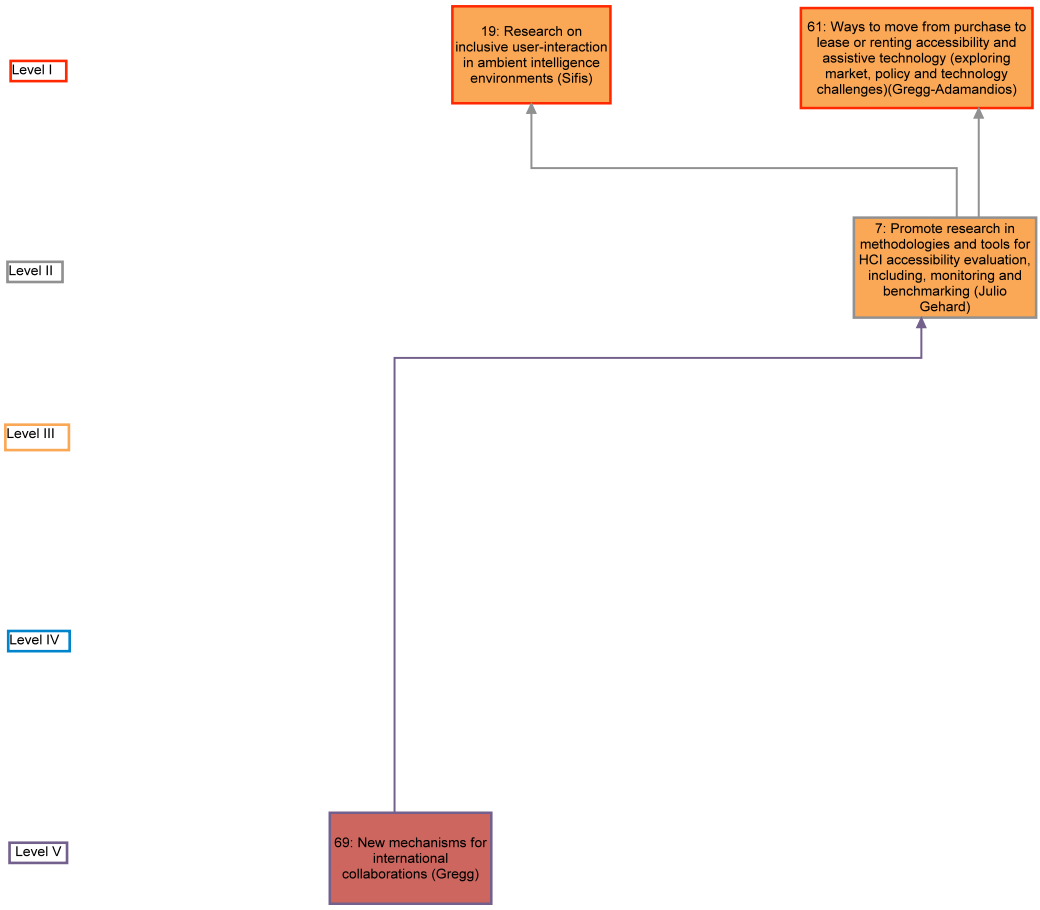
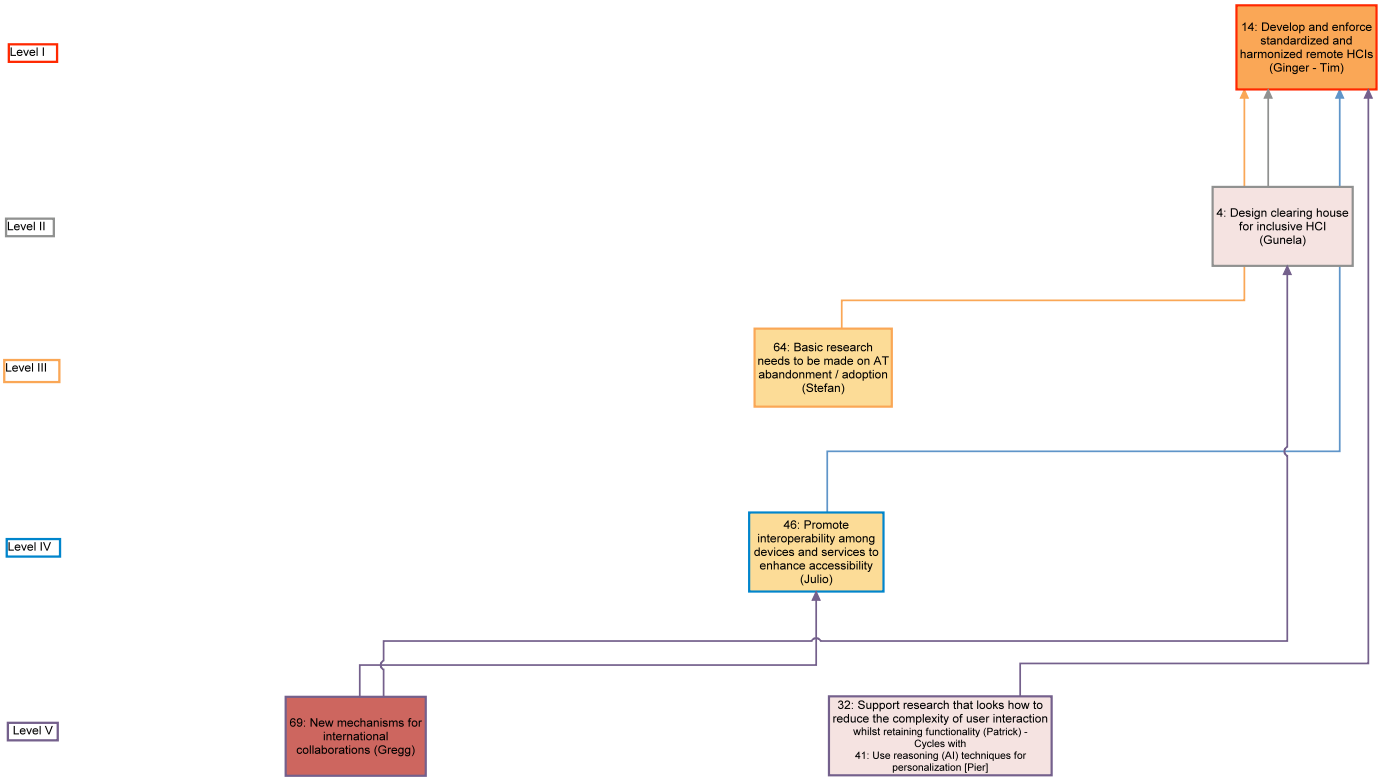


Table and sub-influence map for Factor #14 (3 Votes)

	Supported by	Supported by
Factor #14	#4 #64 #46 #32 & #41	#69 #69



Factor #14 falls in the category of the more visionary or aspirational ideas. This more long-term goal would also require support for the following actions:

- set up a clearing house for inclusive HCI (#4)
- support basic research on reasons for AT abandonment / adoption (#64)
- promote interoperability among devices and services to enhance accessibility (# 46)
- instigate new mechanisms for international collaboration (#69)
- support research that looks at how to reduce the complexity of user interaction whilst retaining functionality (#32)
- support research into the use of reasoning (AI) techniques for personalization (#41).

Table for Factor #35 (3 votes)

	Supported by
Factor #35 Supports directly Factor 2	#29 #32 & #41

This is effectively a subset of the influence map for factor #2 and could be seen as a 'stepping-stone' or intermediate stage towards implementing action #2.

Table for Factor #40 (3 votes)

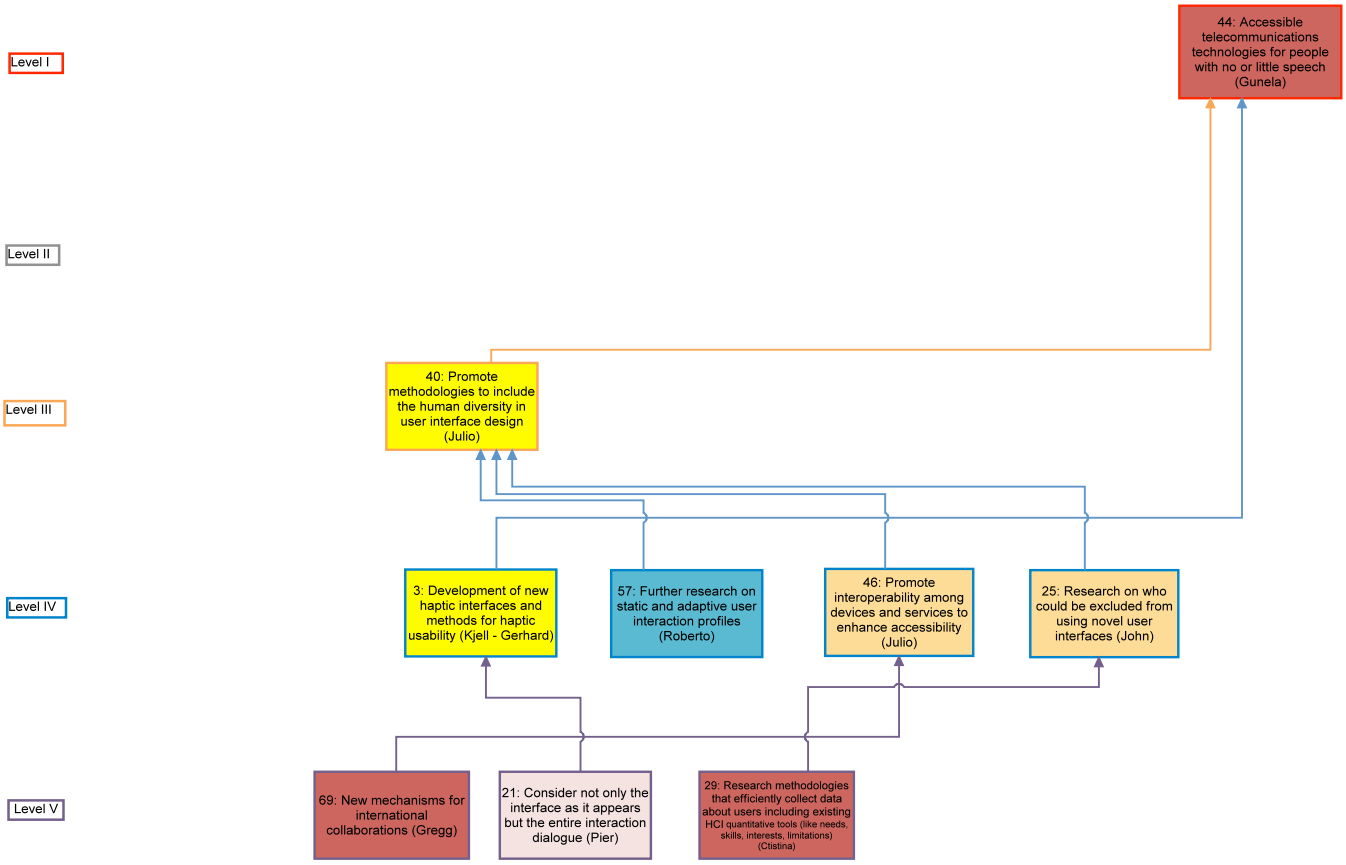
	Supported by	Supported by
Factor #40 Supports directly Factors #15 and #44	#57 #46 #25	 #69 #29

The same can be said of the sub-influence map for factor #40, which is a subset of the influence map for factor #15. If the aim therefore were to be to promote methodologies to include the human diversity of user interface design (#40) the following actions should also be supported:

- further research on static and adaptive user interaction profiles (#57)
- promote interoperability among devices and services to enhance accessibility (#46)
- research on who could be excluded from novel user interfaces (#25)
- instigate new mechanisms for international collaboration (#69)
- research methodologies that efficiently collect data about users including existing HCI quantitative tools (like needs, skills, interests, limitations) (#29).

Table and sub-influence map for Factor #44 (3 Votes)

	Supported by	Supported by	Supported by
Factor #44	#40	#57	
		#25	#29
		#46	#69
	#3	#21	



Factor #44, "Accessible telecommunications technologies for people with little or no speech" is another example of a more visionary/aspirational kind of proposal. There are two actions which would directly support this proposal: promote methodologies to include human diversity in user interface design (#40) and the development of new haptic interfaces and methods for haptic usability (#3). If this proposal were to be selected as a priority the following 6 actions should also be considered for support:

- further research on static and adaptive user interaction profiles (#57)
- promote interoperability among devices and services to enhance accessibility (#46)
- research on who could be excluded from novel user interfaces (#25)
- instigate new mechanisms for international collaboration (#69)
- consider not only the interface as it appears but the entire interaction dialogue (#21)
- research methodologies that efficiently collect data about users including existing HCI quantitative tools (like needs, skills, interests, limitations) (#29).

Table for Factor #64 (3 Votes).

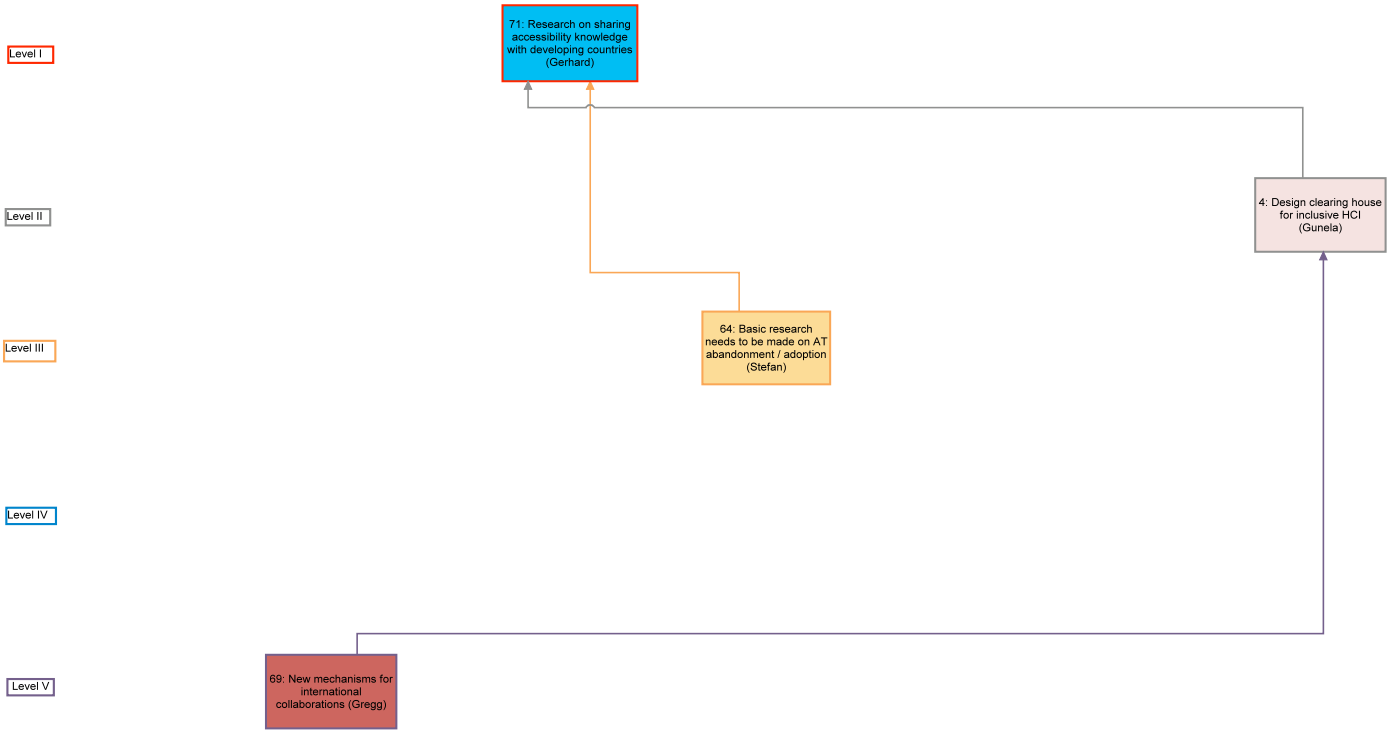
Factor #64 Supports directly factors #14, #63, #71

The sub-influence map for factor #64, "support research on the reason for AT abandonment / adoption" is in fact a small part of the sub-influence map of the three factors #14, #63 and #71, which it directly supports:

- research on the cognitive load associated with various user interfaces (#14)
- research on automated evaluation aids (#63)
- research on sharing accessibility knowledge with developing countries (#71).

Table for Factor #71 (3 votes)

	Supported by	Supported by
Factor #71	#4 #64	#69



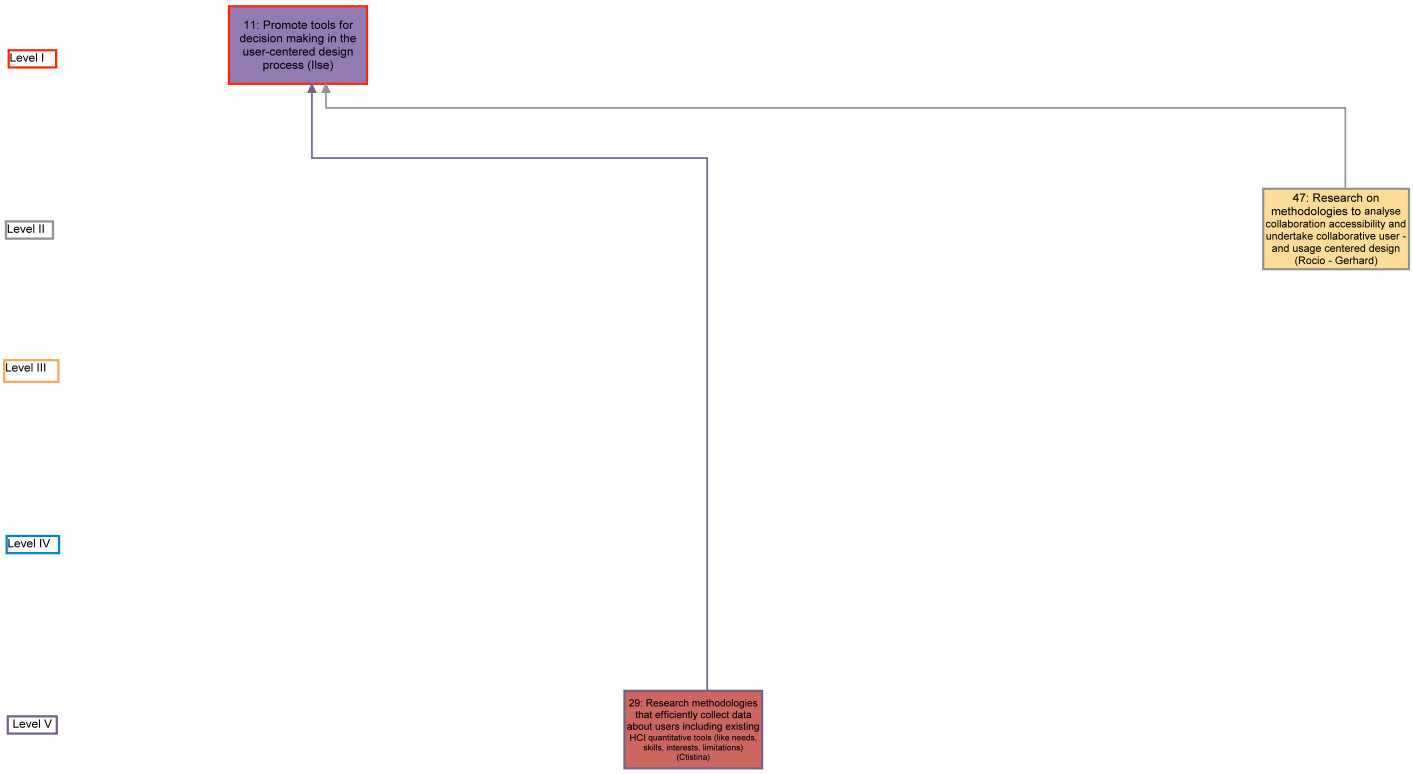
Factor #71 is another example of a more aspirational idea. In this case the sub-influence map is quite straight forward with just three other actions supporting this proposal:

- basic research on the reason for AT abandonment / adoption (#64)
- design clearing house for inclusive HCI (#4)
- new mechanisms for international collaboration (#69).

Other Tables and sub-influence maps for Factors in Level I (top level)

Table and sub-influence map for Factor #11 (2 votes)

	Supported by
Factor #11	#47 #29

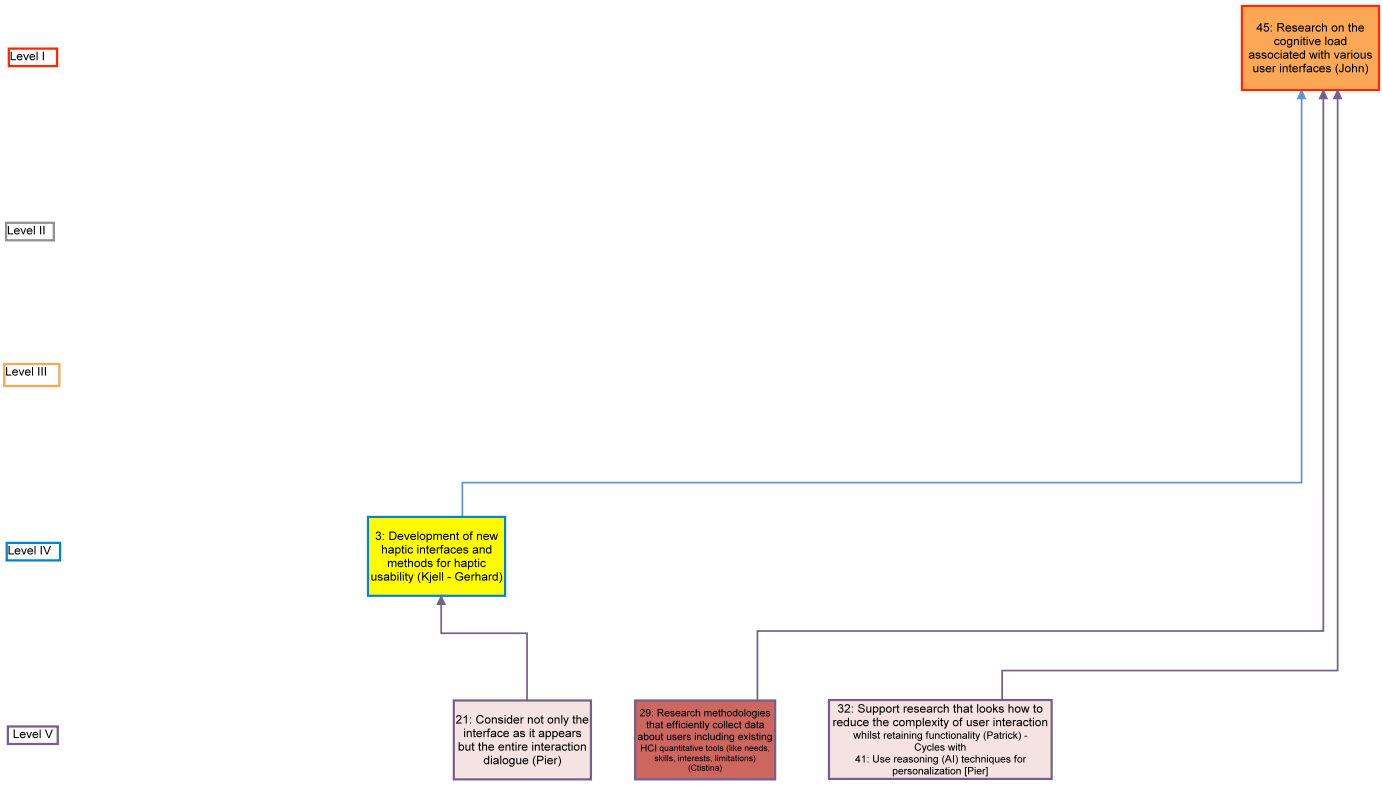


Factor #11 "Promote tools for decision making in the user centred design process" represents a distinctive issue and approach. This proposal is supported by two of the actions from the influence map:

- research on methodologies to analyse collaboration accessibility and undertake collaborative user – and usage centred design (#47)
- research methodologies that efficiently collect data about users including existing HCI quantitative tools (like needs, skills, interests, limitations) (#29).

Table and sub-influence map for Factor #45 (2 Votes)

	Supported by	Supported by
Factor #45	#3 #29 #32 & #41	#21



If factor #45 "Research on the cognitive load associated with various user interfaces" were to be identified as a funding priority, other actions that should also be supported include:

- development of new haptic interfaces and methods for haptic usability (#3)
- consider not only the interface as it appears but the entire interaction dialogue (#21)
- research methodologies that efficiently collect data about users including existing HCI quantitative tools (like needs, skills, interests, limitations) (#29).
- support research that looks at how to reduce the complexity of user interaction whilst retaining functionality (#32)
- research into the use of reasoning (AI) techniques for personalization (#41).

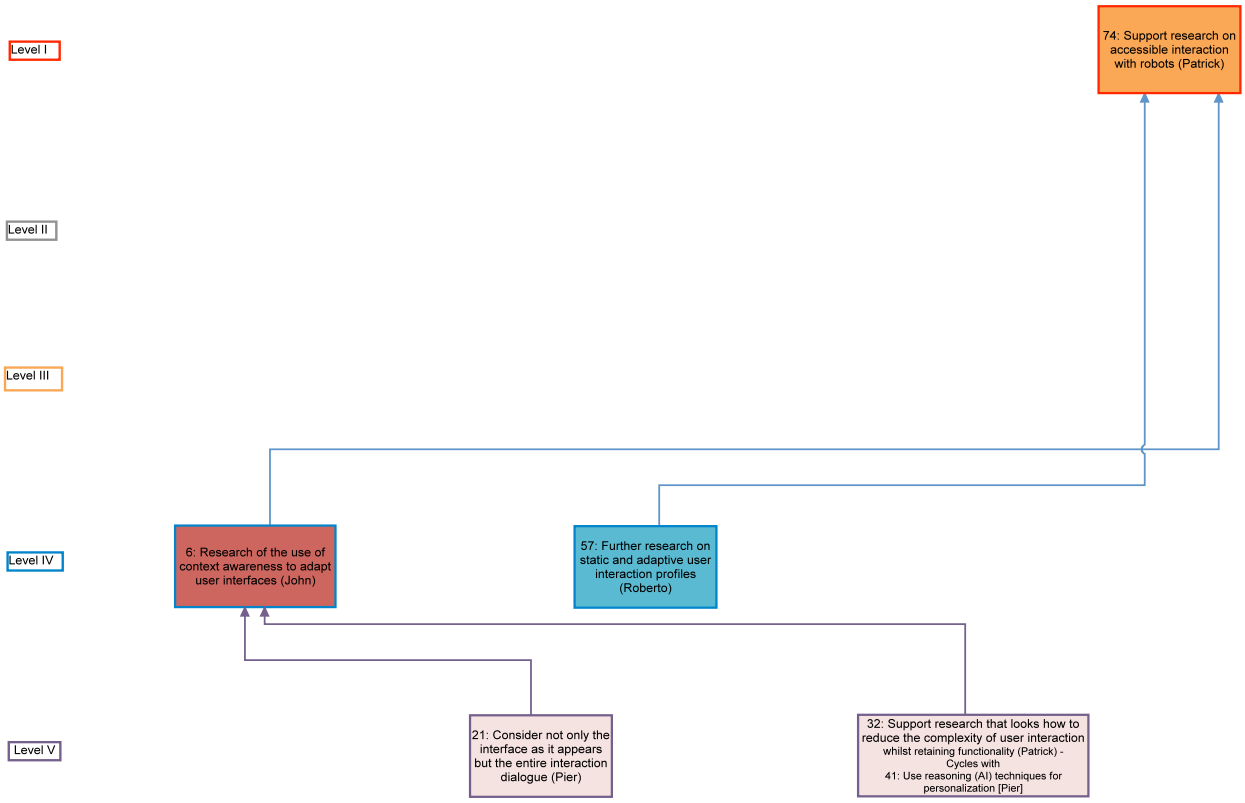
Table and sub-influence map for Factor #45 (2 Votes)

	Supported by	Supported by

Factor #74	#6 #57	#21 #32 & #41

If factor #74 "Support research on accessible interaction with robots" were to be identified as a funding priority, other actions that should also be supported include:

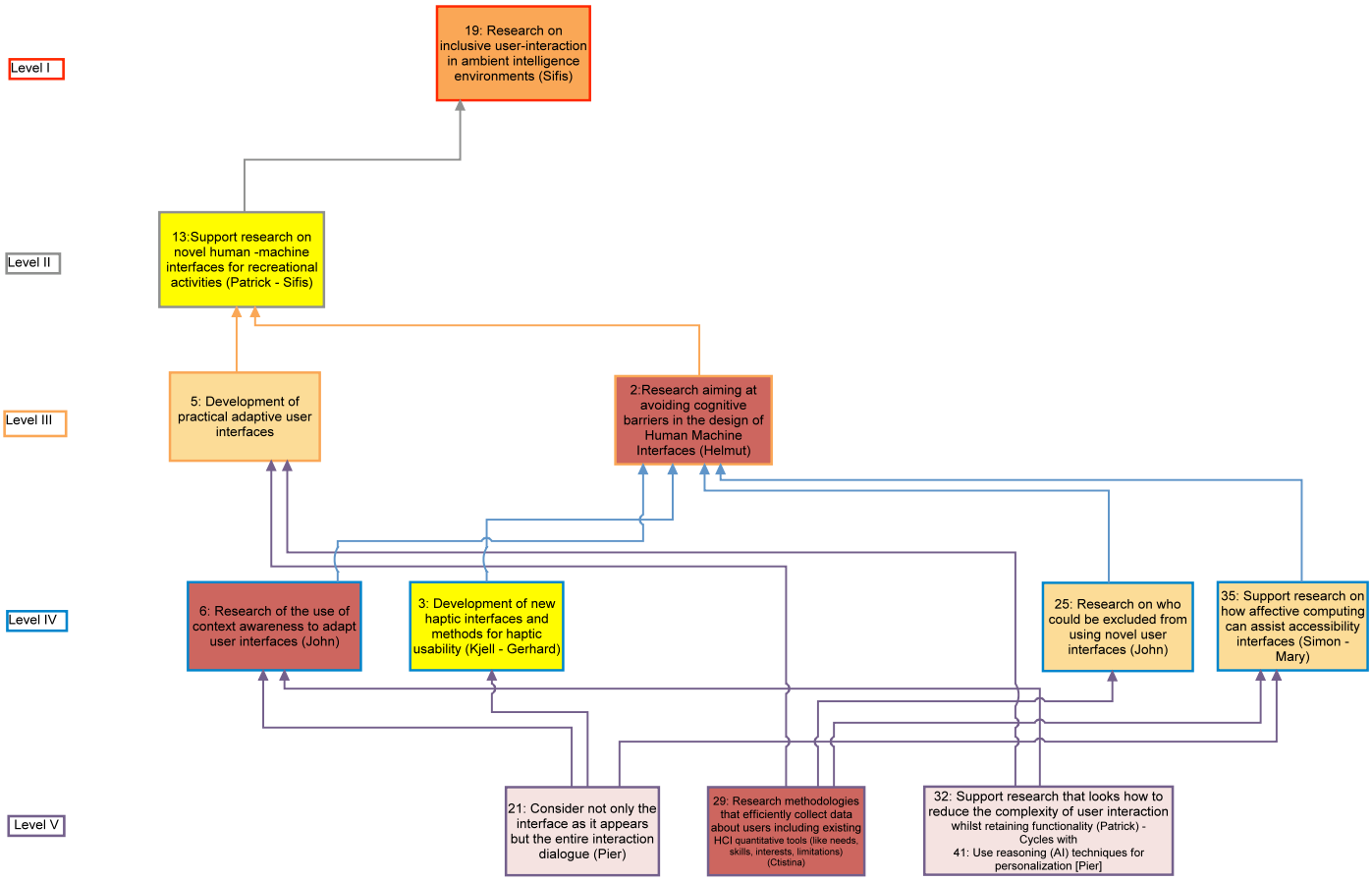
- research on the use of context awareness to adapt user interfaces (#6)
- further research on static and adaptive user interaction profiles (#57)
- consider not only the interface as it appears but the entire interaction dialogue (#21)
- support research that looks at how to reduce the complexity of user interaction whilst retaining functionality (#32)
- research into the use of reasoning (AI) techniques for personalization (#41).



Other Tables and sub-influence maps for Factors in Level II

Table and sub-influence map for Factor #13 (2 Votes)

	Supported by	Supported by	Supported by
Factor #13 Supports directly Factor #19	#5 #2	#29 #32 & #41 #6 #3 #25 #35	 #21 #32 & #41 #21 #29 #29 #32 & #41



The sub-influence map for Factor #13 " Support research on novel human-machine interfaces for recreational activities" is a another subset of the first sub-influence map presented for factor #19 which it supports (Research on user inclusive interaction in ambient intelligence environments). It could thus serve as another intermediate phase or 'stepping-stone' towards implementing factor #19. If therefore the aim of a given FP research call were to be to support factor #13, it would make sense to also support:

- development of practical adaptive user interfaces (#5)

- research aiming at avoiding the cognitive barriers in the design of human machine interfaces (#2)
- research regarding the use of context awareness to adapt user interfaces (#6)
- development of new haptic interfaces and methods for haptic usability (#3)
- research on who could be excluded from using novel user interfaces (#25)
- research on how affective computing can assist accessibility interfaces (#35)
- research that considers not only the interface as it appears but the entire interaction dialogue (#21)
- research into methodologies that efficiently collect data about users including existing quantitative tools (like needs, skills, interest, limitations) (#29)
- research that looks at how to reduce the complexity of user interaction whilst retaining functionality (#32)
- research into the use of reasoning (AI) techniques for personalization (#41).

Table and sub-influence map for Factor #27 (2 Votes)

	Supported by	Supported by
Factor #27 Supports directly factor #19	#64 #6	 #21 #32 & #41

The sub-influence map for Factor #27 is yet another example of a subset of the sub-influence map for factor #19 which it supports (Research on user inclusive interaction in ambient intelligence environments). It could thus also serve as another intermediate phase or 'stepping-stone' towards implementing factor #19. If the aim therefore were to be to "Develop more specific and clear accessibility guidelines for application developers" (#27) it would make sense to also support:

- basic research on the reasons for AT abandonment / adoption (#64)
- research regarding the use of context awareness to adapt user interfaces (#6)
- research that looks at how to reduce the complexity of user interaction whilst retaining functionality (#32)
- research into the use of reasoning (AI) techniques for personalization (#41).

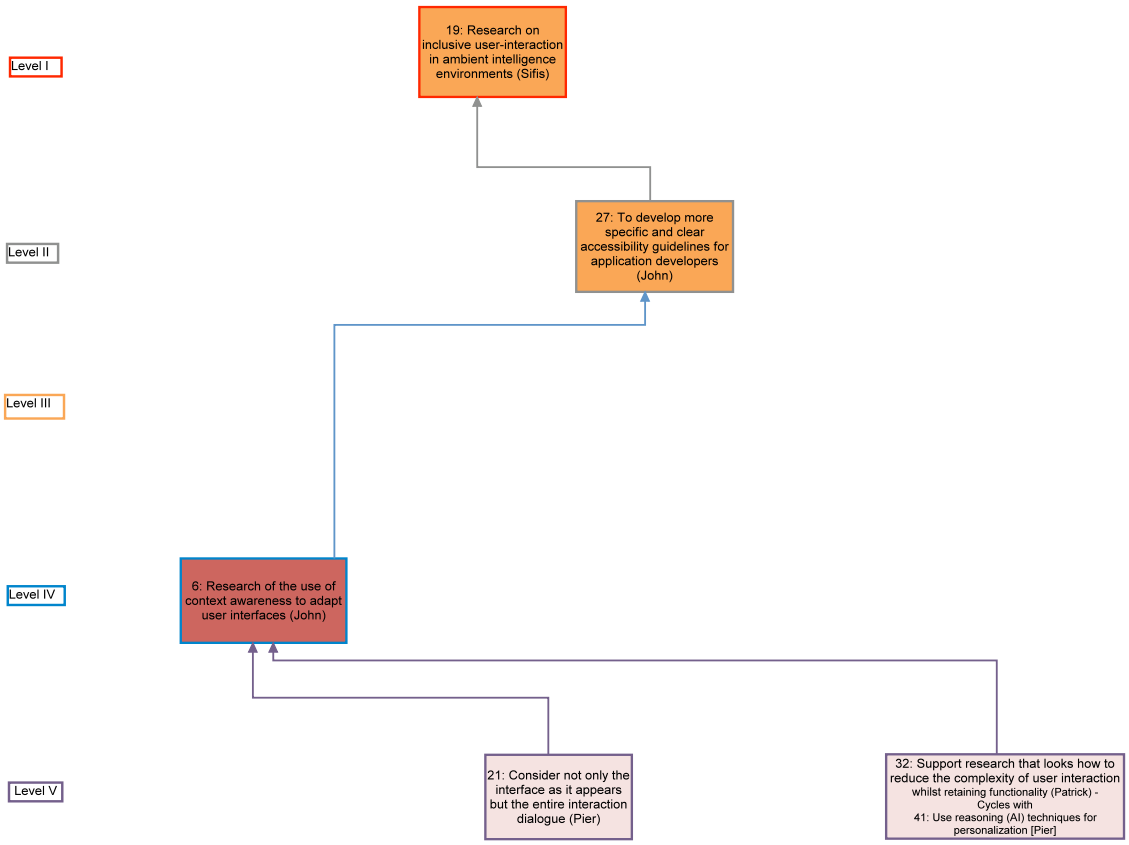
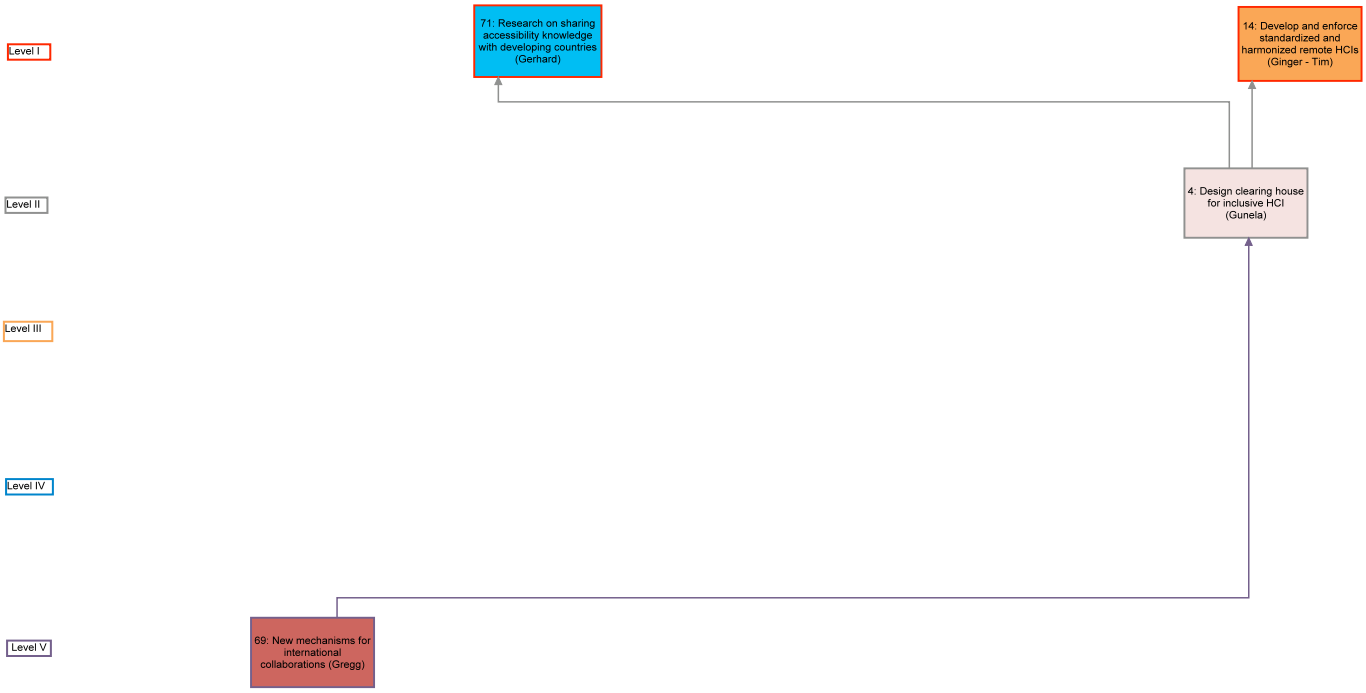


Table and sub-influence map for Factor #4 (2 Votes)

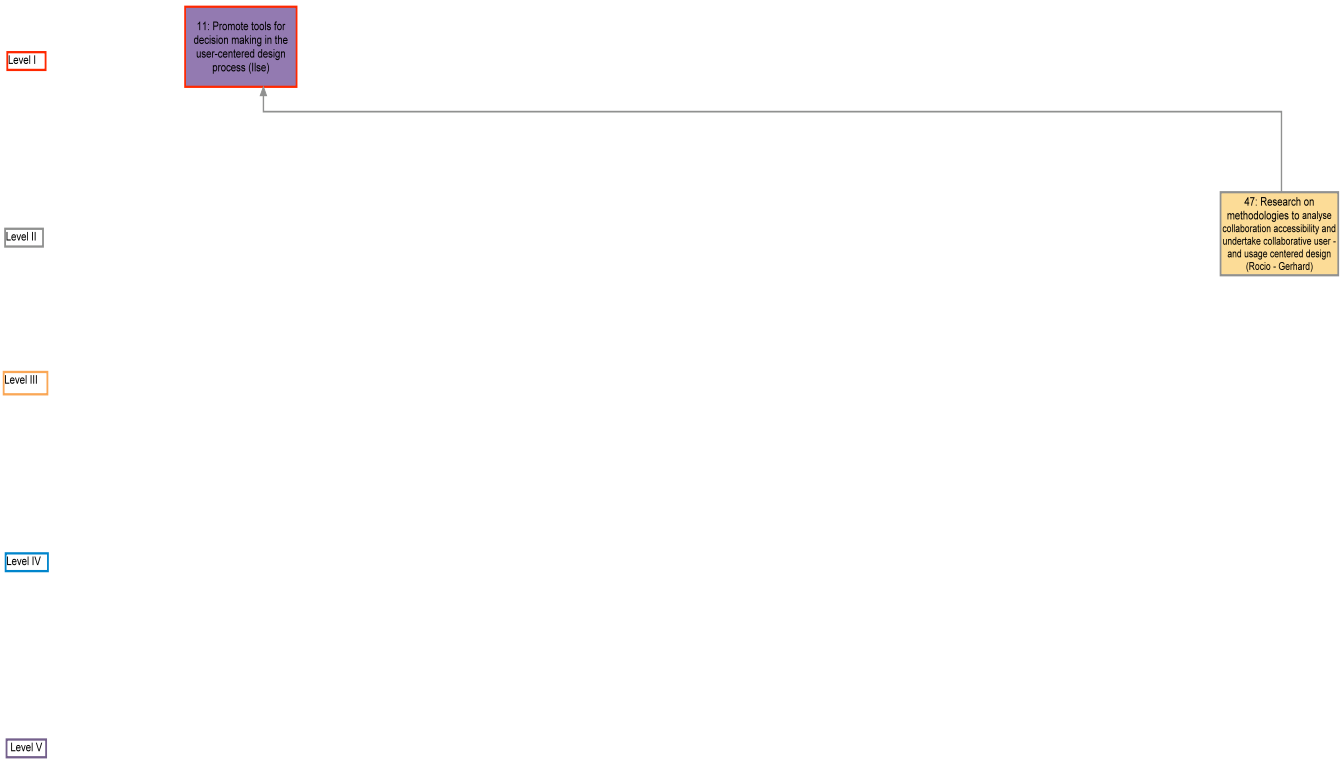
	Supported by
Factor #4 Supports directly #71 and #14	#69



The sub-influence map for factor #4 "Design clearing house for inclusive HCI" can be considered as a subset of the sub-influence maps of factors #71(research on sharing accessibility knowledge with developing countries) and #14 (develop and enforce standardised and harmonized remote HCI's), which it directly supports. The only factor supporting #4 is factor #29: New mechanisms for international collaboration.

Table and sub-influence map for Factor #47 (2 Votes)

Factor #47 Supports directly factor #11



The final sub-influence map presented here "Research on methodologies to analyse collaboration accessibility and undertake collaborative user – and usage centred design" (#47) is a straight-forward subset of factor #11 "Promote tools for decision making in the user-centred design process", which it directly supports.

The overall presentation and initial analysis of the sub-influence maps has highlighted the importance of factor #19 as a visionary/aspirational idea, both in terms of the number of votes received and the number of sub-sets of influence maps (at least 6 identified) that could serve as 'stepping-stones' towards the implementation of this action.

6. Conclusions

In the following paragraphs the conclusions are discussed from two different perspectives: (a) conclusions related to the application of the SDD[SM] process; and (b) conclusions regarding the outcomes of the implementation of the SDD[SM] process.

The application of the SDDP in San Sebastian with 21 participants, including one expert participating via videophone, from a wide range of different stakeholders, was conducted according to and in compliance with the SDDP rules. There was a sufficient number of overall participants covering the whole range of identified stakeholders (see Table 1).

The three virtual SDD[SM] sessions run after the San Sebastian meeting proved, as was the case for the SDDP-1, very useful in completing the structuring phase to enable the generation of the influence tree.

The experience of having an expert participate remotely at such an event was very positive and showed it is feasible. The experiment highlighted, however, the importance of having a sufficient number of microphones in the room so that the remote participant can hear all the interventions. Placing the screen with the picture of the remote participant helps create the impression of a "presence" and enables the remote expert to participate on an almost equal footing.

With respect to the goals of the co-laboratory from the perspective of the implementation of the SDD[SM] process, the following is noted:

1. A list of 75 ideas was generated in response to the Triggering Question. This is considered satisfactory, since the average reported in the literature is 64.

2. The ideas were clarified and discussed throughout the SDD[SM], thus enabling participants to achieve a better understanding of the views of other members and greatly expand their own and others';

3. The ideas were clustered in 18 categories in an interactive manner, thus providing opportunities for further and deeper clarifications of salient distinctions between separate ideas. The process is crucial for what we call "evolutionary learning" (i.e., during the process participants "lose" connection to their own personal ideas and stereotypes in favour of a collective and shared thinking);

4. Participants voted for 50 of the ideas that they considered most important. They subsequently managed to "structure" 33 of these ideas and produce an influence tree;

5. The influence tree produced in response to the Triggering Question, contains 33 ideas spread over 5 levels;

6. The participants had time to discuss and reflect on the influence tree and in general agreed that the arrows in the tree made sense to them;

7. More importantly, the structured dialogue process supported/empowered the consortium partners to identify the most influential research that is missing that could facilitate development of inclusive HCI.

The issue itself of what type of research is missing that could facilitate development of inclusive HCI is a very complex issue involving a wide range of stakeholders from many different areas. The results show that the SDD[SM] methodology is well suited to this kind of multi facet, multidisciplinary problem with interconnected issues, where it can be a useful tool to harness the collective wisdom of a wide range of stakeholders and bring new perspectives and approaches to a given problem. Of course the methodology itself will only generate the raw data in the form an 'Influence Tree" and further input and analysis is required. This will be carried out in WP3 and reported on in Deliverable D3.2. The possibilities of using such a tool with a complex triggering question and the initial analysis can form a useful basis for the further analysis of the types of research that is missing that could facilitate development of inclusive HCI.

Methodology: The Process of Structured Dialogic Design

The term "Structured Dialogue" is sometimes used to simply denote a dialogue more organized than the simple "talking" and exchange of ideas. In contrast the Structured Dialogic Design[10] (SDD[SM])) process is a methodology, which supports the generation of truly democratic and structured dialogue amongst teams of stakeholders with diverse views and perspectives. It is particularly effective in the resolution of complex conflicts, interests, and values, and in achieving consensus based on a common understanding and strategy. It is grounded on 6 complex systems and cybernetics axioms and 7 laws from systems science; it has been grounded both scientifically and empirically in hundreds of settings on a global scale for the past 30 years. Scientists and practitioners worldwide are guided by the Institute of 21st Century Agoras[11].

The Cyprus team has extensive experience in the application of the methodology. They have utilized it in many public debates in order to facilitate organizational and societal change. For example, they have utilized it in many European networks of experts. The COST219ter[12] is a network of scientists from 20 countries (18 European, the USA, and Australia) who were interested in exploring the question of how new technologies ambient intelligence and next generation networks can make their services more useful to people with special needs. The COST298[13] network also aims to make broadband technologies more accessible to the wider public. The scientific communities of Cost219ter and Cost298 utilized SDD in order to outline the obstacles, which inhibit the application of the above technologies on a wider scale. Based on the results of the SDDs, they designed corresponding strategies for the next 3 years. Insafe[14] is a European network of 27 Safer Internet Centres who used SDDs in many meetings in order to identify the inhibitors, produce a vision of the future, and agree on a plan of action. More information is available on the CyberEthics Cyprus Safer Internet website[15].

The UCYVROK[16] network utilized SDD[SM] in order to determine the reasons for which young people in Europe do not participate in European programs. The results were presented to the European Parliament. The SDD[SM] methodology was also used in order to ease the dialogue between Greek-Cypriots and Turkish-Cypriots since 1994. This dialogue culminated in the creation of a peace movement. Many reports are still being utilized by the network, and are available on the program's page[17].

SDD[SM] was designed especially so that it can assist non-homogenous groups in tackling complex problems within a reasonable and restricted time frame. It facilitates the annexation of contributions by individuals with vastly different views, contexts, and aspirations, through a process that is structured, conclusive, and the product of cooperation.

A team of participants, who are knowledgeable of a particular situation, generate together a common outline of ideas based on a common understanding of the current problematic situation and a future ideal one. SDD[SM] promotes the focused communication between participants and supports their ownership of the solution as well as their actions towards implementing it.

Structure and Process in a typical SDD Co-Laboratory

When facing any complex problem the stakeholders can ideally approach it in the following way:

1. Develop a shared vision of an ideal future situation. This ideal ***vision map*** serves as a ***magnet*** to help the social system transcend into its future state.

2. Define the ***problematique***, also known as the wall of inhibitors i.e., develop a common and shared understanding of what are the obstacles that prevent the stakeholders' system from reaching its ideal state.

3. Define ***actions/options*** and produce a roadmap to achieve the goals.

The three phases are implemented using exactly the same dialogue technique. Each phase leads to similar products:

1. A ***list*** of all ideas and their clarifications [SDD^{SM} is a self-documenting process].

2. A ***cluster*** of all ideas categorized according to their common attributes [using a bottom-up approach].

3. A document with the ***voting results*** in which participants are asked to choose ideas they consider most important [erroneous priority effect = most popular ideas do not prove to be the most influential!]

4. A ***map*** of influences. This is the most important product of the methodology. Ideas are related according to the influence they exert on each other. If we are dealing with problems, then the most influential ideas are the *root causes*. Addressing those will be most efficient. If we deal with factors that describe a future ideal state, then working on the most influential factors means that achieving the final goal will be easier/faster/more economic, etc.

In the following, the process of a typical SDD^{SM} session, with its phases, is described in more detail.

First. The breadth of the dialogue is constrained and sharpened with the help of a ***Triggering Question***.

This is formulated by a core group of people, who are the Knowledge Management Team (KMT) and is composed by the owners of the complex problem and SDD^{SM} experts. This question can be emailed to all participants, who are requested to respond with at least three contributions before the meeting either through email or Wikis.

Second. All contributions/responses to the triggering question are recorded in the *Cogniscope II*^{TM} software. They must be short and concise: one idea in one sentence! The authors may clarify their ideas in a few additional sentences.

Third. The ideas are clustered into categories based on similarities and common attributes. If time is short, a smaller team can do this process to reduce time (e.g., between plenary sessions).

Fourth.All participants get five votes and are asked to choose ideas that are most important to them. Only ideas that receive votes go to the next and most important phase.

Fifth. In this phase, participants are asked to explore influences of one idea on another. They are asked to *decide whether solving one problem will make solving another problem easier*. If the great majority of participants think one idea has a significant influence on another idea, a connection is established on the "Tree of Influences". The way to read that influence is that items at the bottom are root causes (if what is being discussed are obstacles), or most influential factors (if what is being discussed are descriptors of an ideal situation or actions to take). Those root factors must be given priority.

Sixth Using the root factors, stakeholders develop an efficient strategy and come up with a road map to implement it.

Further Information on the science SDD[SM]

The interested reader who might want to find out more about the underlying science of structured dialogic design may begin by researching the terms "Lovers of Democracy", "Hasan Ozbekhan", "Aleco Christakis", "Club of Rome", "Structured Dialogic Design", "Cyprus Civil Society Dialogue", etc. Available are also two books co-authored by the Father of the science: [18, 19]. A number of Wikis are also dedicated to the science: [20, 21, 22]. Selected publications include a Description of the technology of Democracy [23].

There are several publications of the Cyprus group, which describe the application of SDD[SM] in the Cyprus peace-building process: [24, 25, 26]. Furthermore, two recent publications provide an easy-to-comprehend introduction to the methodology and the ethical considerations associated with its application [27, 28].

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ANNEX I: Ideas with clarifications

Ideas with Clarifications

The word "Delete" in square brackets indicates that the participants decided to delete the initial idea (as duplicate or irrelevant). Names in square brackets indicate the first name of the participant(s) generating the idea.

1: Research to get rid of HCI [Pier-Herjan]
This response is a provocative way of expressing the idea that to have development in inclusive interaction, it is necessary to go beyond the usual model of user interaction with a computer. The situation is now much more complex. In the future people will not have to interact with computers but with many types of intelligent objects and collection of objects and the situation will therefore be much more complex. It will be necessary to develop new metaphors and new ways of accommodating this complex situation in such away that people are included,

Computers get smaller and are not recognizable as computers any more. They hide in all kinds of devices and in (smart) environments. Next to this, people do not explicitly interact with these devices and environments, but are constantly living in between, and often passively or implicitly using them. Therefore, research should focus on Human Environment Engagement.
A natural corollary to the discussion on ubiquitous computing. That is the incorporation of the computer into the environment so that you don't feel like you're interacting with the computer but rather with the environment around you (and even remote environments)

2: Research aiming at avoiding cognitive barriers in the design of Human Machine Interfaces [Helmut]
The accessibility/ usability of ICT products and services sometimes fails because of a „mismatch" between the system functionality and the user's mental model of the system.
There are of course many possible physical barriers in human-machine interaction, which may prevent full accessibility, but there are also cognitive obstacles that may reduce the accessibility of the system. Many user interfaces just reflect the functional performance of the system on a certain level, so if the user does not fully understand the functionality of the system, leading to a mismatch between the functionality an the user's internal mental model of this functionality, or if the user is cognitively overloaded by the complexity of the system or by too many details and questions being requested by the interface, then the human-machine interaction is going to fail. Research is needed to improve this situation.

3: Development of new haptic interfaces and methods for haptic usability [Kjell-Gerhard]
Many haptic artifacts has been developed so far for instance to be used by blind people. Similar techniques should be developed for other categories of disabilities, e.g. people with cognitive and motor impairments. Furthermore haptic usability, its user centred design, evaluation and accessibility in general should be investigated.

4: Design clearing house for inclusive HCI [Gunela]
A clearing house is an online information transaction process for bringing together a wide cross-section of design methods, relevant standards and existing products as well as ongoing research. A design clearing house for inclusive HCI will draw together valuable information online so that companies can quickly and clearly understand inclusive HCI. Commercial companies have limited time to develop interfaces and to encourage them to use inclusive design practices, a central place online with impartial information would be valuable.

5: Development of practical adaptive user interfaces [John]
An adaptive user interface automatically charges based on the behaviour of the user. These interfaces have worked well in the laboratory, but have sometimes been problematic for applications such as public access terminals.

6: Research of the use of context awareness to adapt user interfaces [Jon]
Context awareness can greatly help to build a new adaptive user interfaces that can provide more simple and useful functionality to users. For example, for a user who is sitting in front of the TV and does not know how to use the remote control because it is too complex, context awareness can be used to provide the remote control through his touch-screen mobile device with very simple functionality (going up and down for volume control and channel selection, for instance). It thus greatly simplifies the same functionality that user experiences with other types of devices. Using this context awareness can therefore help user operate different devices in a simpler way but with the same degree of functionality.

7: Promote research in methodologies and tools for HCI accessibility evaluation, including, monitoring and benchmarking [Julio-Gerhard]
Even if the Web is far from being universally accessible, it is one of the environments were accessibility requirements are better known. The reason is the availability of accessibility guidelines to help the designer and the evaluator. They also allowed the creation of semiautomatic accessibility evaluation methods and tools. A similar set of clear and unambiguous accessibility guidelines would help to advance in accessible HCI evaluation.

8: To do research on tangible artifacts to promote e-inclusion of people with special needs in technologically mediated environment [Rocio]
- [Wikipedia] Tangible user interface is a UI in which a person interacts with digital information through the physical environment (i.e. to give physical form to digital information).
- New Human Machine Interfaces to support people with special needs promoting their eInclusion and engagement in public spaces (e.g. tangible artifacts for accessing knowledge in a museum could improve informal learning).

9: To promote research that closes the gap between interfaces for inclusion [Leonor]
Create multimedia interfaces instead of speech technology, eye tracking tec. Etc. Having in mind or based on the multimodal human abilities /capabilities.

10: Facilitate the creation of digital accessible materials to non accessibility experts [Cristina]
The HCI can be accessible but if the contents produce are not the accessibility will be compromised. So there is a need to create tools to help authors to produce material/contents that are accessible to all, if they don't have the skills to do that.

11: Promote tools for decision making in the user-centred design process [Ilse]
A lot of methods and tools are available to guide the user centred design process in the early stage of the process. For example methods are available for participatory and co-design. These methods are suitable until the prototype stage. To take the step from prototypes to implementation in real life situations additional tools are necessary. There is a need for tools that facilitate the decision making process between different stakeholders in the final stages of the user centred design process. These tools should guarantee equality between the inputs from all stakeholders, facilitate cooperation and provide guidelines to look for alternatives and compromises when requests from stakeholders are not aligned.

12: Promote research on the role of inclusive HCI to support self-management in health care [Mary-Ilse]

In the Netherlands and also in a lot of other European countries the trend in healthcare is towards a focus on self-management by clients and a active attitude towards care delivery in stead of passively consuming care services. To facilitate this trend all self-management possibilities must be inclusive. This can for example be the equipment needed to measure your own blood pressure and send the data to a doctor but also the way access to Electronic Patient Files is arranged. Research in this area is needed.
All the more so due to the fact that nursing homes are becoming more expensive and the government have caped the beds, thus blocking general hospital beds with patients who could easily be monitored from home.

13: Support research on novel human-machine interfaces for recreational activities [Patrick-Sifis]
New modes of interaction, including for example, gesture recognition, touch, voice control, breath control, could all be explored as a means of interaction and should be explored for the whole range of recreational activities ranging from gaming, entertainment and the playing of musical instruments..
It may be best to avoid thinking about interfaces as being tied to particular activities., but it could be good to look at topics such as music and recreation in order to gather the full range of different types of interfaces we should have. We should instead be trying to come up with a very diverse set of interface techniques, which can match any tasks we try them with.
We simply don't know what all the things we want to be doing in the future will be. And we can't run around creating interfaces one and a time for tasks as we encounter them.
We ought to be looking at recreational activities because they can give us some of our most challenging interface problems. Also if you look at where education and other activities are heading, often they are looking more like recreation activities of the past.

14: Develop and enforce standardized and harmonized remote HCIs [Ginger-Tim]
The idea relates to the extent to which standards bodies such as DLNA can and should be encouraged to implement an infrastructure which will support the user interactions required to realise inclusive design.
One particular area of interest is the Accessible Connected Home, an area that the current convergence of connected home technology making multiple devices readily available to remote control devices, and the availability of portable personalisable hardware capable of supporting accessible remote control clients, offers a potential connectivity bonus for disabled users.
One current model of accessibility, emphasises the exposing of the functionality of the target device (the one that the user wants to be able to access) to a client device which might employ a number of user interaction options depending on the disability group for which it has been developed. This model is particularly appropriate for devices such as set top boxes, networked TV's Hi-Fi units etc.
This model can be used to service the needs of disabled users with very different requirements, e.g. a blind user with a screen reader enabled mobile phone, and a severely disabled user with movement in a single limb whose Personalised Assistive Control Terminal could support switch selection of scanned icons on a screen, offering a very different control scenario.

15: Delivery of the interface to many more varied platforms [Simon-RobertH]
It is my belief that we are seeing a convergence of devices and the people who use them along with a divergence of the devices themselves. This means that developers must make their applications more flexible, more customizable, and more personalized – in effect more open – if they are to deliver these applications to the many different types of devices – and interfaces on those devices – without creating additional work by building an application for each individual device. Assistive technologies can, and will, take advantage of this flexibility and openness and become just another device to which flexible applications, content, and interfaces need to be delivered. By understanding that assistive technology is really just extreme adaptation we can

implicitly encourage developers to create openness not previously experienced when the only platform for delivery was a closed predictable desktop environment;

16: New interaction metaphors and paradigms for computing [Adamantios]
There is always a need for exploring new metaphors and paradigms for improving user interaction with other users or machines. Though this area concentrated much interest and research in the 90s, nowadays it seems as if it not any more attractive. Quite wrongly, according to my opinion, as it is the one that may help us find genuinely new ways for *defining* problems and not only *'solving'* ones: we still live under the long shadow of the desktop metaphor. Even in augmented reality world assumptions, it is again a desktop metaphor that is underlying. Furthermore, and having in mind how much inter-disciplinary and cross-disciplinary approaches are praised, there is no other natural place for breeding such an approach than the research for new interface and interaction metaphors. Of course, a difficulty in defining a new metaphor or implementing it is *how literally one does this*: do we have to stick to a one-to-one mapping between the original metaphor and its implementation? Is it ok if we just pirate some ideas and concepts and put this as an add-on to dominant interface metaphors? If the aim is to start thinking out of the box, research on interface metaphors is perhaps the most obvious step to take!

17: Research and development on provision of accessible interfaces inclusive products and services in an ubiquitous manner [Roberto]
Today, many disabled people, elderly people, and other citizens have its personal devices (e.g. their PC or mobile) with its interfaces configured according to their needs and preferences (e.g. larger fonts, high-contrast colours etc.) and, when needed, with their preferred Assistive Technologies (ATs) installed (e.g. a screen reader). However, when trying to use another device (e.g. a PC in a library), they have to change the configuration of them and/or to install their ATs in order to be able to use them. If they do not know or cannot do it, this may prevent them from using these devices.

This research trend aims to make use of the potential of the cloud technologies to enable anyone to interact with any device by using their preferred interfaces and AT. This is one of the research lines of the GPII initiative (http://gpii.net/).

If succeed, in the future, when someone goes into any one of the libraries for the first time the staff can take them over to any available computer and activate the personalization wizard on the web. The staff can then walk away and this friendly, and actually fun, program goes through and talks (using speech, captions, and sign language) and shows the person different access features and technologies and finds out what works best for them. When that's done, it automatically stores what the person needs somewhere where they can use it anywhere, any time. Now when that person sits down to any computer, at any of the libraries, the computers automatically and instantly change into the form that they need *[Source: GPII website]*.

18: [DELETE] Research on collaborative accessibility [Gerhard]

19: Research on inclusive user-interaction in ambient intelligence environments [Sifis]
Although a great deal of research is already dealing with "smart" environments and Ambient Intelligence technologies, it is important not to shift the focus away from the user aspects involved. In that respect, research on issues related to accessible user interaction in these so-called "Smart environments" is needed, focusing on people with disabilities and older people. Emphasis on the technological side could be placed for example on adaptive and adaptable User Interface design, on ubiquitous computing, and so on. Apart from the technological aspects however, other issues affecting user interaction in smart environments, including ethical issues, socio-cultural, economic and educational characteristics, user abilities and functional limitations, privacy, security and safety concerns should be further investigated. It is obvious that all such

issues have a direct effect on technological development. It is crucial however, for the successful deployment of inclusive Human Computer Interaction that the development of new technologies, interaction paradigms, design methodologies and tools, all address these issues.

20: Create a paradigm that avoids the traps of either forcing all to use a single new technology or for all content to be rewritten (interesting to study the growth of the web) [Stefan]
Currently many proposals for universal accessibility of the web and documents in general fall into one of two traps:
- All content must be re-written to a new spec that is universally accessible by existing software.
- Any existing content can be accessed but only with **this** reader/software.
We could call these two problems the authoring and the reader problem. Any realistic solution will have components of both approaches (e.g. a standard for content and a minimum functionality requirements for software). Even when an attempt is made to skirt the two problems they will often come back into the research in a back door. This is a big problem on the level of web 2.0 and semantics vs. presentation, and it needs both clever and standards based solutions.

21: Consider not only the interface as it appears but the entire interaction dialogue [Pier]
This proposal is connected to idea number 1, in the sense that the meaning of this idea is that in the complex emerging environment you can no longer think in terms of what you can implement with the interaction objects which are made available by the different interaction technologies available. It is more a question of developing new ways of interaction rather than adapting existing user interfaces. You therefore have to think back as to what is the dialogue that people have to carry out with the environment or with a machine in order to complete a given task and therefore restructure the dialogue. It will then obviously be necessary also to develop new metaphors and new objects for the implementation of the interaction with a complex new environment.

22: Support the research in detecting the behaviour, emotions and intentions of the user without the conscious control by the user [Helmut]
The standard paradigm of human-machine interaction includes a standard functional model of how the user perceives the system/machine to work. Usually the user gives direct input or controlled input into the system and then expects that the system acts or reacts in a certain way according to their expectations and intentions. What is suggested here is to change the paradigm and to change the roles. So far the user needed a mental model of the machine or system, what is being proposed is that the system has ac quires a model of the user and the system tries to understand the user's intentions and what he is doing within the context of where he currently may be. This model of the user would thus include the context of the current activity, maybe the usual behaviour of the user and his proposed/assumed intention for the very close future, so that the system can act as an intelligent assistant to the user. This requires, not only technological research (for example in respect to the sensors to be employed), but also and eve more so, research on the human side of the model. This includes user modelling, behaviour and activity modelling and so on. This requires much research from the field of psychology and cognitive science. This paradigm could be used in assistive environments such as Ambient Assisted Living and it could possibly avoid accessibility problems in standard interfaces.

23: Development of sophisticated brain-computer interfaces for people with special needs [Kjell]
The ultimate aim of this research is to be able to put a hat on and communicate with the computer. This may however happen some years in the future. The research should reveal which special needs that will benefit from these kinds of interfaces. It is anticipated that it may be of special importance to persons with cognitive, sensory and motor disabilities.

24: Training programs for disability representatives to effectively participate in R & D processes [Gunela]

People with disabilities need to be included in the design process based on the disability movement's motto: "Nothing about us without us". To make this possible, disability representatives need to have in-depth training and support to understand how R & D processes operate so they can contribute effectively both in product design and standards committees. There have been training programs in the past but these need to be evaluated to find the most effective method for ongoing mentoring for a successful and sustainable process.

25: Research on who could be excluded from using novel user interfaces [John]
Companies designing products with new interfaces need to know, before the product is on the market, who will find their interface difficult or impossible to use. This needs to be matched against the target market for their new product.

26: To develop more specific and clear accessible guidelines for application developers [Jon]
One of the main problems when integrating a new accessibility solution within mainstream ICT is that the guidelines and references that the developer has as his disposal to create accessible applications are very complex, very difficult to use and at a very high level. They are really explaining how to they should be used for a specific use case of the applications. It therefore takes a lot of time fir the developers to create these accessible applications and very often they do not provide accessible solutions because they do not have the time to do it. Therefore, if more specific guidelines could be provided that are targeted towards what developers really do, i.e. referring to the specific tools they are using for these applications, such as for example, eclipse, Netbeans, visual studio or the adobe tools, it would be much easier for developers to create accessible solutions thus increasing the chance of a greater number of applications being created that are accessible to mainstream ICT.

27: To do research on how to use mobile technologies as a universal middleware in public and private environments [Rocio]
- [Wikipedia] Middleware is computer software that connects software components or people and their applications. That means software that provides a link between separate software applications.
- The idea is trying to make mobile devices (mobile phones, PDAs, tablet PCs, etc.) adaptable to different environments.
- People with special needs could have their user profile in the cloud, which could be used, for example: To adapt his/her mobile device to the environment in different locations, To export & import from one mobile device to another one.

28: Research about the exclusion that has been created by HCI [Leonor]
In what extension HCI creates exclusion? Why, when and how people are excluded by HCI? The term people include not just disabled people but everyone that may be excluded because they are not able to adapt themselves to new ways to perform an activity or a task. Changing frequently the people way of thinking or performing leads to the abandonment of technology?

29: Research methodologies that efficiently collect data about users including existing HCI quantitative tools (like needs, skills, interests, limitations) [Cristina]

30: Make social media inclusive [Ilse]
Social media has changed the way we communicate and interact with each other and has the potential to have a positive impact on the lives of a wide range of people. It is important to make it possible for everybody to experience the positive impact. However little research has been conducted on how inclusive social media is and what can be done to ensure that social media is inclusive. It is especially important at this stage since social media is still under development and at this point in time accessibility can be integrated and influence the design of social media in stead of providing accessibility afterwards.

There is a study initiated and financed by PTS that can be found at…
http://www.pts.se/upload/Rapporter/Funktionshinder/2011/2010-32-jmfr-sociala-medier-tillganglighet.pdf.
Technosite has also provided an analysis of "Accessibility of Social Networking Services". The abridged version (in English) is available at:
http://www.discapnet.es/Observatorio/Accessibility_Observatory_on_Social_Networks.pdf.
This is interesting topic with some particularly interesting challenges especially with regard to individuals with cognitive disabilities. This can be a very powerful way to allow people to have access to a wider audience. However it is also very easy way for people to misrepresent themselves and to prey on people who do not understand. Is also a very easy way for people to get let into situations where they give information that should not, respond to requests they should not, and can get abused in some very ugly ways.
On the other hand the safest thing is just to lock people up and not let them out and this is wrong too.
There is a lot of really valuable work to be done on how to make social media accessible and safe. There's also a lot of work around ethics that needs to be done to look at whether "protecting" people with disabilities is ethical. When we protecting them and when are we taking away their freedoms.

31: Promote research into the cost of eye-tracking and tongue piercing based interfaces [Mary]
Eye tracking and tongue piercing based interfaces are often very expensive and are often the only form of assistance for people with severe motor restrictions. The recommendation here is to research potential advancements and mobility enhancements whilst aiming to reduce the price.

32: Support research that looks how to reduce the complexity of user interaction whilst retaining functionality [Patrick]
It is no trivial task to reduce the complexity of a user interface whilst retaining its full range of functions. However, very often there is a lot of unnecessary complexity that can be removed without removing functionality.
It is also possible to layer complexity so that people who do not need all of the functions do not have to contend with them.
If we really want to have digital inclusion, we really need to focus on this topic. We can't continue to create interfaces that are only usable by the top half of the population (or the top 10% as is often true now).

33: [DELETE] Extend quantitative tools from HCI to inclusive design [Stefan]
Many of the HCI evaluative tools need to be adapted to specific disabilities, often by a researcher without the tie to validate the new wording/scales. These can span tools designed for users with full sets of typical sensory abilities to evaluation of effort by persons with cognitive disabilities. Careful 'porting' and evaluation of the resultant tests – in the very same way the current tests were evaluated – are necessary.

34: Research on how to enforce accessibility in consumer goods [Ginger]

35: Support research on how affective computing can assist accessibility interfaces [Simon-Mary]
While still novel, measures of stress – based on say Galvanic Skin Response (GSR) – have been, and are becoming, increasing common measures in experiments to quantify human behaviour, particularly anxiety frustration disorientation and hesitation. However, what is the possibility of using GSR (along with predictive task models) to quantify interaction problems and automatically adapt the interface such that stress is reduced and interactivity progresses faster. Even if we are not able to adapt the interface automatically and directly we may still be able to understand the areas of frustration that are common among different user groups and change the interface such that these areas of stress are reduced.

36: Non-visual interfaces for all (mainstreaming of non visual computing) [Adamantios]
Visual channel is powerful - we all accept this. And nowadays that we have fast internet and the ability to transfer high quality video, support sophisticated graphical interfaces and exploit as much as possible this channel, why not do it? However this is only the one side of the coin. The modern individuals who are continuously on the move depend, as expected, too much on the visual channel: while walking, in the metro or train, or driving on the motorway people send and receive messages, read emails or documents, google or browse on the internet. To do all this, they depend on visual information that is provided by some small(er) or big(ger) visual displays. Why not give a chance to some new form of mainstreaming non visual interaction? Why not have people reading their emails or their newspaper *while not - actually - reading them*? Why not have people editing a document *while not having visual access to it*? Why not have people googling for information or searching for a restaurant for tonight *while not looking at some screen* (big or small)? One supporting argument for this is to think about the super rich people who are always accompanied by custody of secretaries and aides who take care of all their stuff. Interaction there goes through them and they usually dictate their wishes or are told about the findings.

37: R&D on text normalization, simplification, personalization and evaluation [Roberto]
Research on technologies for text processing aimed at facilitating the information handling by both the end-users and the services based on linguistic processing:

- Text normalization and simplification: E.g. easy-reading text personalization (not only static texts but also online user-generated texts: such as for social participation in social networks).
- Text simplification to improve: multi-lingual conversion (national languages), sign language conversion, etc.

38: Research on mid to long term interaction by disabled and elderly people [Gerhard]
Many elderly people have acquired some disability over period of 5 to 20 years. This research is about understanding the user's capabilities and the changes in their interaction over a longer period of time und order to understand the need for adaption's or applications in adaptive systems. Typically this requires to acknowledge some form change of technology, to analyze the interaction and methods to ensure persistence of the user's profile in the new technology.

39: Promote ubiquitous computing and programming tools [Sifis-Eddie]
[A synthesis of clarifications from Iosif, Eddie V. and Gregg Vanderheiden]
Research would need to focus on computers that do not appear to be computers. That is to say, the post-desktop model of Human Computer Interaction. Ubiquitous computing could overcome the prejudices and inability of any user. Technological determination is not the way to facilitate the development of inclusive HCI. Research into developing computers with appropriate programming tools could provide "machines that fit the human environment instead of forcing humans to enter theirs" (J. York and P.C. Pendharkar 2004).
This is an important question and is the future of computing. In the future we will be having things we would not think of as computers like we do now. We will have information appliances in one sense, but in a broader sense we will really have devices so much as will have services. We will simply turn to whatever objects are near us and use them to access services that will be available in the cloud, Or in the environment, or all around us.
It is actually hard for us to conceive of what it will be like. But we need to start thinking differently if we want to really begin doing serious research and get ahead of the curve.

40: Promote methodologies to include the human diversity in user interface design [Julio]
Most current User Centred methodologies are not able to cope with the features of all people. Designers wanting to produce accessible Human-Machine interaction systems need sound

methodologies and commercial tools to do it. Most designers are used to advanced design environments, therefore, in order to be adopted by the industry; these methodologies must be sound and usable in large scale software development projects.

41: Use reasoning (AI) techniques for personalization [Pier]
We are generalizing the way in which we are considering the interaction; we say that it is no longer possible that you have interaction with predefined tasks and the system has to be able to 'think' about what is the purpose and intention of the user. The system has therefore to be able to imagine what people need and thus help the user in a practical way in reaching the desired outcome. Two examples can be mentioned: the first example is the scenario where you are cooking something in the kitchen, where the kitchen should be able to understand what your next moves should be. The second example is a multimodal interface for booking a medical examination, where the idea is that for the system to be really useful, it should be able to replicate closely the behaviour of a person whilst observing the user and knowing how to speak and interact with the user. The system should thus be able to organise a dialogue in such a way that it can help a person understand what is the environment, what are the different types of examinations you can have and guide you through the system.

42: Research on reasons why existing knowledge and standards on accessibility are not known or applied by HCI developers [Helmut]

43: Identify where research is needed to obtain universal access in ambient intelligence environments [Kjell]
Quite a lot of work is going on to obtain ambient intelligent services using different artifacts. Ambient services for people with special needs have however not been addressed much so far. It has to be identified where more research is needed and relevant research has to be carried out.

44: Accessible telecommunications technologies for people with no or little speech [Gunela]
People with no or little speech (sometimes called complex communication needs) may have cerebral palsy combined with severe physical disabilities or have had a laryngectomy, an acquired brain injury or a stroke. As a result they have limited possibilities in using telecommunications technologies, such as the mobile phone. It is the combination of physical impairments that present challenges in finding ways for them to seamlessly link telecommunications with their alternative and augmentative communication devices. As this is often an overlooked group of people with disabilities, research is needed.

45: Research on the cognitive load associated with various user interfaces [John]
With interfaces provided in more than modality, the different interfaces may impose different cognitive demands on the user. For instance, it is easy to get 'lost' with auditory output of a complex interface which was designed for visual presentation.

46: Promote interoperability among devices and services to enhance accessibility [Julio]
Many services available to people with disabilities have very different interfaces that are frequently incompatible among them. The idea behind this proposal is to make compatible and interoperable all the equipment available to each user. The ideal scenario is to provide access to all services by means of a single interface (well adapted to the user). This interface would be available in the different devices that are handled by each user (supposedly well adapted to the features and needs of the specific user). That may require promoting the definition or adoption of a common/standard middleware as accessible interoperability framework.

47: Research on methodologies to analyze collaborative accessibility and undertake collaborative user- and usage centred design [Rocio-Gerhard]

Social approach to better collecting end users' requirements and opinions, as well as evaluating prototyped UI solutions, (for example, using web 2.0 facilities).
Collaborative approaches to web accessibility start by identifying barriers by disabled people themselves and raising the social pressure for example on website administrators. Best practice examples of such collaborative approaches are web sites (e.g. IBM's work, or the FixTheWeb initiative) used for "fast and easy" reporting accessibility issues of online services and content but also detailed information about how to fix problems. Similarly, a geographical information system for mobility impaired people may allow to collaborate actively by identifying wheelchair accessible/non accessible locations. A system may allow collaborative correction of speech recognition captioning of audio recording for educational purposes, and whose editing of captions could be provided voluntarily by hearing class mates when funding for professional captioning was not available. All these are existing good examples for Web 2.0 services improving accessibility through "crowd sourcing". If such approaches will scale up to the extent and quality of commercial services like Facebook and large voluntary organizations such as Wikimedia is unclear and requires further analysis, involvement of end user organizations and implementations.

48: Create a meaningful use of HCI clearly supporting activities [Leonor]
Why some products and services are not been used? Why some products and services failed?

49: Research that promotes inclusive practices of professionals responsible to develop new products or services [Cristina]
It is important that we can find ways to motivate professionals to use the knowledge and inclusive practices (e.g. standards, research findings, etc.) to develop new products or services, or else the accessibility and usability will always have problems.

50: Promote research on inclusive HCI for highly dynamic impairments [Ilse]
Patients in hospitals who have a temporary impairment need products that support them. In a noisy environment everybody has a hearing disability. Persons with co morbidity can have a changing need for example every day, every week, every month. A person can also have a 'bad day' and corresponding different needs. Main characteristic of the examples mentioned above is that they are often highly dynamic. Research is needed to investigate how these persons could be served. In addition dynamic impairments are dependent on different situations therefore context awareness needs to be incorporated into the solution. The solution will broaden the target group for inclusive products which can be interesting for manufacturers.

51: [DELETE] Support research on emotional interaction [Mary]

52: Support research on the implications for people with disabilities of the use of biometric systems for identification and security [Patrick]
Biometric systems could be embedded in an intelligent environment that could recognize a person and then tailor the interaction to their particular needs within a given context. Where biometrics are to be used to gain access to a given service or interface, research is required to ensure that no groups of users are being excluded from the service because of the means of biometric identification.
This is a critical area for research. We all know that some people don't have some biological systems (fingerprints, irises, etc.) so anything which depended upon one of these (and sometimes even one of two of these) would not be accessible.
The research may focus on things that everybody has such as a heart beat or their circulatory system.
The research could focus on the most compatible combination of approaches that would work together and always provide something that an individual had. Especially pre-work through of networked systems there might be a very wide range solutions.

Any use of cloud technologies such as GPII will of course need to have some type of authentication. And if we are working with people all over, codes will not work and biometrics may be the most reliable and usable.

53: Research into how AT can provide better than typical results (e.g. cyber-human) [Stefan]
This is in two dimensions.

1. Disabled person with prosthetics / orthotics may achieve goals that 'typically' ambled cannot (e.g. 'the blade runner' south African athlete)
2. Assistive technology may enable both typically ambled persons to perform tasks that the context at the time may make impossible to complete ordinarily (e.g. using a computer in the dark with Jaws)

This positive side of the assistive technology domain needs formal principled research, beyond what the military is doing now.

54: Research on how to increase and widen accessibility in professional education [Ginger]

55: Identify human factors barriers to health, education and participation of low income groups [Simon]
The opportunities created by digital technologies are not enjoyed by the whole of society; indeed, there is a strong correlation between digital exclusion and social exclusion. There are significant and untapped opportunities to use technology better on behalf of citizens, communities, and digitally disenfranchised groups. However, to achieve inclusion, systems must be created seeing the human factor as a part of an integrated solution from the outset, not as an adjunct but also not as a focus. In addition, the multiplicity and ubiquity of devices and their interfaces are key to successful inclusion, and systems must be tailored to what users actually require and will use; as opposed to what organizations and government require and use. For instance, uses on low income may not be able to afford general-purpose computational facilities and therefore it may be more appropriate to deliver applications and content via other mediums such as mobile devices, games consoles, digital television, or other as yet undefined applications and devices. Only by making sure there is access to, what now seems to be compulsory digital interactivity in areas such as education and health care, can we make sure that the next generations have better chances than the current one.

56: [DELETE] User interface as a service (exploring market and technology challenges) [Adamantios]

57: Further research on static and adaptive user interaction profiles [Roberto]
This research line aims to change the paradigm of the interfaces design from "one-size-fits-all" to "one-size-fits-one". Its objective is twofold:
- Adaptive interfaces. The user interfaces will not only adapt to the user needs and preferences, but also will adapt to:
    - Time changing user needs (e.g. due to highly dynamic impairments)
    - Context information (e.g. indoors, outdoors)
    - User behavior (e.g. presenting common operations of the user or changing the interface for a simpler one when the user seems to be confused)
    - Temporal constraints (e.g. in a sunny day some Automatic Teller Machines' interfaces may use high contrast colours)
    - Etc.

- Interaction profiles. Medically based categories of disabilities do not provide useful information about the needs of the individual. Many people "fall through the cracks" or feel that their needs are stereotyped according to one classificatory category when ICT access solutions are delivered according to traditional disability groupings. A classification of being "blind" does not indicate whether they are Braille literate, have any tactile sensation in their fingers, what language they

speak, whether they have good hearing, whether they have residual sight, colour or light sense. As such the category does not provide useful information for configuring an ICT system. The variety of needs that are grouped under the classification "blind" can be vast.
Recognizing that persons with disabilities are one of the most heterogeneous groups of users and that individuals with disabilities are likely to be constrained in their ability to adapt to a stereotypical characterization of their access requirements, a new approach to inclusive design was developed which enabled users to create their own individualized personal profile from an extensible list of common functional descriptors. This enables a one-size-fits-one response from a system that is able to transform, augment or choose from a pool of diverse resources. This approach was first specified in the IMS AccessForAll standard and later in the ISO24751 multi-part standard *[Source: proposal of FP7 IP project: "Cloud4all", selected by the evaluators and currently under negotiation]*.
It is interesting to note that we are talking about interfaces and not talking about devices. The key is to separate the idea of interface from the idea of device. We need to start thinking about how to think of interfaces as services or ways to access services.
In the future we will be less about devices and more about functions.
Accessibility we need to think about interface as being separate from device or function.
Mainstream products will never provide a variety of interface we need. We need to figure out how to allow swappable or pluggable user-interface is so that people can use the interface they need. This takes us back to the URC work.

58: [DELETE] Research on the methods for haptic usability [Gerhard]

59: [DELETE] Research on inclusive interfaces for entertainment [Sifis]

60: To promote common research on user needs and preferences to be used by all e-inclusion projects [Jon]
When most of the European projects that are dealing with accessibility start, they first carry out a study on the state-of-the art and user needs and preferences so that they can identify their limitations, their desires, their needs and their preferences. The main problem is that most of the time, this effort is done several times and we are effectively reinventing the wheel and we are wasting effort that could be more efficiently redistributed amongst the projects. So the idea is to have a common research and database where user organisations and technological partner look for the accessibility of the different ICT and assistive technologies so that they can identify these preferences, needs and limitations. This information could then be provided to all the other projects dealing with accessibility so that they can use this state-of-the-art as an input into their project.

61: Ways to move from purchase to lease or renting accessibility and assistive technology (exploring market, policy and technology challenges) [Gregg-Adamantios]
In the recent years we talk about software-as-a-service while for several decades now we are all used to the concept of leasing a car or equipment or a house. So it seems that it is high time that we make the transition towards new ways to move from purchase to lease or renting accessibility and assistive technology. Why own a communication aid if you can lease one? And why own a navigation system for blind or elderly while renting one as a service? Social insurance agencies may also have their own views on this – it may prove more cost-efficient for them both for the long run and for an immediate introduction; however there is need for exploring market, policy and technology challenges and dynamics. Finally accessibility matters here again: if you leave the ownership model to move to the leasing or renting, you need intuitive accessibility in the offered solutions as your users don't regard anymore the learning of the system as an asset. As long as you may use a system for a few days or weeks, it needs to be easy-to-use and make the life of the user easy regarding manipulation and maintenance.

62: Digital literacy stepping stones [Gregg]

63: Research on automated evaluation aids [Gregg]
Although it would be ideal if everyone had a crack team of specialists to evaluate their needs and make recommendations for accessibility solutions, we do not have anywhere near the number of such specialists as are needed to address everyone who needs special interface assessments. In addition the specials we do have trouble keeping up with everything that is available.
Research is needed on the development of evaluation wizards that can be used both with and without professional evaluators to help users figure out what types of solutions would be best for them. Where professional evaluators are available these wizards can help to make the evaluation process go more quickly and provide ways to try out ideas with users. They can also help suggest new interfaces that the evaluators may not be familiar with but that should be considered allowing evaluators to keep up-to-date in this rapidly changing area. For those who cannot afford or who live in a place where evaluators are not available, use wizards can help people become familiar with different techniques or strategies that might address their needs.
All of this is much easier to say however that to do in the evaluation process can be quite complex. So while there is great need and potential for this is also a very difficult area. This would make it a difficult but high payoff and high need area of research.

64: Basic research needs to be made on AT abandonment/adoption [Stefan]
There are only a handful of papers on AT abandonment, mostly form the 90's. In order to fully address the distressing level of AT abandonment (40-70%) a principled, longitudinal research agenda of this phenomenon, segmented by AT and user type and compared to similar non-AT systems needs to be set out on. The implications of the resultant body of knowledge could potentially deeply affect AT form design to marketing.

65: Interface design - knowledge of computer paradigms [Steve]
Current use of technology relies on extensive knowledge of the system and this inhibits users. Examples such as radio buttons, dialogue boxes, menu windows. These are not simple terms for novice users. Context information and how that should be represented in the most user friendly way needs to be explored.

66: Interface design: input and output [Steve]
More often that not, the usability of a system is a poorer cousin to accessibility when an interface is designed for disabled people. Web accessibility is a prime example as it is possible to have a more accessible website which is completely unusable. When designing an interface, consideration needs to be given to the integration of accessibility features so that the user can navigate and use the device as quickly and as efficiently as possible. The Accessibility features need to be "smart" rather than dumb. By this I mean that the importance of information needs to be considered and how and when it is delivered to the user.

67: Usable accessibility [Steve]
An interface should be configurable, or at least a variety of interfaces should be available, to allow a user to choose from a range of different input and output methods without impeding on the functionality of the rest of the device. An example of this using a touch-screen paradigm could be that when the user has to input text for an SMS message the alphabet could be in a vertical list with the user scrolling up and down to the letters rather than having to input text using an onscreen keyboard. This differing input or output method could be delivered by an application.

68: [DELETE] Standards for accessibility [Tim]

69: New mechanisms for international collaborations [Gregg]
There is tremendous need and limited funding in the area of accessibility. The European funding

model has created a mechanism for international collaboration within Europe but mechanisms are needed to prevent duplication of effort and to allow closer collaboration between all nations in this area.
Pooled funding and cross jurisdiction funding are both extremely difficult. However other mechanisms might be explored. Some of these might involve common roadmaps and research platforms. Others may indeed involve international collaborative efforts among funding agencies. We should explore this to find better mechanisms for building on each other's research in a coordinated fashion.

70: Research on how to make accessibility simpler to deliver, apply, configure, support and use and explain to policy makers [Gregg]
- simpler for users to figure out what meets their needs
- simpler for companies, schools etc to apply it, and maintain it
- simpler for users to install, invoke, configure
- simpler to (re)apply across all the technology that people encounter.

71: Research on sharing accessibility knowledge with developing countries [Gerhard]
Few researchers in developing countries such as Thailand or China are investigating accessibility in their culture, using their own language and develop an understanding of the processes involved in creating a sustainable impact. Often the economics is much more demanding low budget solutions. The development of eScience has shown in the past an approach to create distributed research groups. Developing countries may become involved in research on accessibility of training material is provided, best practice approaches described and pitfalls are expressed.

72: Dynamic composition complex interfaces (mash-up of services) [Roberto]
This is an emerging trend linked to the automatic generation of personalized interfaces that requires of more research. It focuses on the automatic generation of personalized interfaces by using a mash-up of Web services.

A use case is shown below: "Mario is a Spanish blind person travelling abroad. When interacting with a public eKiosk, he indicates that his preferred language is Spanish and that he requires a screen reader. The eKiosk have installed software for automatic generation of personalized interfaces enhanced with the possibility of using mash-up of services. In order to provide the most suitable interface to Mario, the eKiosk's software composes a personalized interface by making use of its personalization capabilities, and two Web Services (WS): one WS provides automatic translation among different languages, and other WS provides screen reading services".

73: Accessibility of IPv6 enabled consumer appliances [Gunela]
IPv6 will be the new Internet addressing protocol and we will see a large take-up of IPv6 by ISPs in the near future as the current IP addresses are being depleted. There is a potential that an increasing number of consumer appliances will have unique IP addresses, which can automatically connect to the Internet for maintenance and communications. The day of the Internet-enable fridge and washing machine may be coming. Already in Japan, rice cookers are connected to the Internet. People use rice cookers daily and if an elderly person hasn't used their rice cooker, a message is sent to their relative and/or a service centre that they may need assistance. It is an opportunity to research inclusive HCI in a wide range of IPv6-enabled consumer appliances.

74: Support research on accessible interaction with robots [Patrick]
A great deal of research is being carried out in the field of robotics. There are of course many different fields where the applications could be implemented, including the area of Ambient Assisted Living and daily help at home. For example, there could be a role for robots to assist older people in their daily lives. It is important to support research that ensures that any new applications in this field take the users needs and preferences into account. It is crucial that this

area should include aspects both from the technical user-interface and human factors points of view.
As noted elsewhere, this whole potential not only for more natural ways of controlling robots but also for having robots as companions.
It also raises the ethical questions around using robots instead of humans to serve as companions. Though it is not entirely clear why this would be different than using animals for companions.

75: Create development environment for accessibility solutions [Gregg]
We have an incredible resource in professors, students, clinicians, and consumers with ideas on how to create new or improved accessibility solutions. However it is often very difficult to do all the work needed to build them from scratch. It would be much better if these individuals had an environment where they could realize their ideas without having to write massive amounts of code. Apple has had great success in creating a myriad of new, creative, (and some not so creative) solutions by providing a development environment that made it easy to create applications in a rich set of tools to build them with. It is possible to create applications in as few as three days.
By creating open source platforms that can be easily adapted by researchers to create functional solutions we can tap this creativity more easily in the more ideas get to market.

ANNEX II: Participants in SDDP2

Facilitator Team

Main Facilitator

Dr. Yiannis Laouris is a Senior Scientist and President of the Cyprus Neuroscience and Technology Institute. He heads the "New Media Lab". Neuroscientist (MD, PhD) and Systems engineer (MS) trained in Germany and the US. Publishes in the area of neuroscience, learning through computers, the web and mo- bile phones and about the potential role of IT to bridge the gaps (economic, gender, disabilities etc.) in our society. He is a senior SDD^{SM} Facilitator and has several publications about the theory of the science of dialogic design also together with its Founder Prof. (emeritus) Aleco Christakis. He collaborated with Prof. Patrick Roe to implement SDD^{SM} co-laboratories for COST219ter and COST298. He also collaborates with the EDEAN and DfA projects.

Assistant Facilitators

Mrs. Georgina Siitta Achilleos serves as a Coordinator of the Cyprus Safer Internet Center, which includes an Awareness Node, a Hotline and a Helpline. She has a bachelor's degree in Psychology from St. Francis College in Brooklyn, New York. Mrs. Siitta participates in most projects coordinated by the New Media Lab of CNTI and also works as the liaison to the Head for many organizational issues regarding the projects and the organization. She is a trained facilitator of structured dialogue (SDD^{SM}) and has organized and participated in dozens of settings in several countries.

Mrs. Tatjana Taraszow holds an MSc in Psychology with emphases on media, educational, and organizational psychology (University of Tübingen, DE & McGill University, CA). Trained mediator, trained facilitator of structured dialogue, and trained in non-violent communication. Coordinated two bi-communal projects in Cyprus and published a number of papers, which discuss the results of SDD^{SM} co-laboratories between Greek-Cypriot and Turkish-Cypriot stakeholders. Research team member of the Cyprus Safer Internet Center - CyberEthics, the EU Kids Online Project. She coordinates the Moblang.eu project. Other research includes: study of teenagers' behaviour in social networking sites, validation of video-game-like interfaces, and development of research questionnaires for children, parents and educators.

Participants

Jon Azpiroz. Vodafone (E)
Mr. Azpiroz is at the R&D Project Management at Fundación Vodafone España.

Stephan Carmien. Fatronik (E)
Dr. Stefan Carmien holds a Ph.D. In Computer Science with certificate in Cognitive Science from the University of Colorado (Boulder) 2006. He currently holds the position of staff scientist at the Fatronik?Tecnalia foundation in San Sebastian Spain. Dr. Carmine's work focuses the study of the socio-technological environment formed by a technological system, its context and the human user. In systems he has developed he has emphasized deep personal configuration (meta-design) and end-user programming as a solution to technology abandonment.

Ginger B. Claassen. Siemens IT Solutions and Services GmbH (D)
Mr. Claassen studied computer science at the University of Paderborn (Germany) and the School of Computer Science at Carleton University (Ottawa, Canada). For more than 10 years Mr. Claassen worked as a research assistant for the C-LAB, a joined research and development laboratory of Siemens AG and the University of Paderborn, with special focus on "accessibility" respectively "Design for All". Mr. Claassen is blind, and therefore knows from his own living and working the problems and barriers persons with disabilities are facing in our modern information and communication society.
Since 2008 he works for the Siemens "Accessibility Competence Center" and for the "Siemens Access Initiative". He has been involved in various commercial and research projects, provides "Design for All" training to colleagues and customers and presents various accessible solutions at international exhibitions and congresses.

Simon Harper. University of Manchester (UK)
Since January 2006, he has been a member of the School of Computer Science in the position of Career Development Fellow in the Human Centred Web; part of the Information Management Group. He is interested in how disabled users interact with the World Wide Web (Web) and how the Web, through its design and technology, enables users to interact with it. He believes that by understanding disabled-user's interaction the understanding of all users operating in constrained modalities where the user is handicapped by both environment and technology is enhanced. He sees fundamental research into users with disabilities as a natural preface to wider human factors research. He is currently investigating and modelling user experience to formulate solutions which will enhance Web accessibility for visually disabled users and the usability of small-screened mobile devices. He is mainly working in the Web's, so called, 'long-tail' creating novel methods of making obfuscated structure, information, and semantics more explicit.

Adamantios Koumpis. ALTER (GR)
Mr. Koumpis heads the Research Programmes Division of ALTEC S.A., which he founded at 1996 (then as independent division of Unisoft S.A.). His research interests include quantitative decision making techniques and Info Society economics. He successfully lead many commercial and research projects in Greece in the areas of E-Commerce, public sector and business enterprise re-organisation and information logistics, concerning linking of data/information repositories with knowledge management and business engineering models.

Roberto Torena. Technosite - ONCE Foundation (ES)
At present, Mr. Torena is the manager of Technosite's Brussels Office for the internationalization of the INREDIS research results and the establishment of European eAccessibility networks. He is also coordinator of the group Accessibility + Interoperability + Ubiquity on the Plataforma Tecnológica eVIA. In 2008, he was a protocol researcher for the INREDIS project "Relation interfaces between users with disabilities and different environments" and managed the Interoperability Protocol Work package.

Prof. Gregg Vanderheiden[1]. Trace R&D Center & University of Wisconsin-Madison (US)
Professor Vanderheiden is the Director of the Trace R&D Center and a Professor in both the Industrial & Systems Engineering and Biomedical Engineering Departments at University of Wisconsin-Madison. Dr. Vanderheiden has been working on technology and disability for just under 40 years. He was a pioneer in the field of Augmentative Communication (a term he coined in the 1970's) before moving to computer access in the 1980s. Many of the accessibility features that are now built into every Macintosh, Windows and Linux computer were created by his group in the 1980s. He has worked with over 50 companies, served on numerous governmental advisory

[1] Professor Vanderheiden will attend the full SDDP-2 meeting from Wisconsin by videoconference.

and study committees on both sides of the ocean, and has chaired and/or edited many of the early accessibility standards. He is co-founder of "Raising the Floor" (http://raisingthefloor.net) and initiated the international efforts to build National and Global Public Inclusive Infrastructure (gpii.org).

Prof. Gerhard Weber. Technical University Dresden (DE)
Professor Weber is since 2007 Chair for Human-Computer Interaction at the Institute for Applied Computer Science, Technische Universität Dresden. He has more than 25 years work experience in the field of assistive technology as researcher, as teacher at Overbrook School for the Blind, Philadelphia, as scientist at F. H. Papenmeier GmbH, and recently as professor teaching on this subject. Topics include tactile graphics, screen reader, web accessibility, personalization of electronic books for blind and deaf people, and accessible ubiquitous systems. He is an expert for ISO on haptics and the current Chair of IFIP Working Group TC13.3 "HCI and disabilities".

Participants who are members of the CARDIAC consortium[2]

Prof. Julio Abascal
Professor Abascal is a Professor of the Computer Architecture and Technology Department at the University of the Basque Country located in Northern Spain. He co-founded the Laboratory of Human-Computer Interaction for Special Needs that has participated in several R&D projects at national and international level.

Gunela Astbrink
Ms. Astbrink is based in Australia and she is the Principal of GSA Information Consultants an organisation specialising in conducting research and policy development in many facets of ICT for people with disabilities.. She has 20 years of international experience in research and policy with a focus on regulatory processes to benefit people with disabilities.

Ilse Bierhoff
Ms. Bierhoff is a research project manager at Smart Homes, an independent expert centre for smart houses and smart living based in the Netherlands. She graduated as human-technology engineer and has specialised over the past 8 years in user centred design and technology for older persons. Her main activities at Smart Homes are in the field of the use of smart home technology for independent living and more efficient care delivery.

Ass. Prof. Kjell Åge Bringsrud
Dr. Bringsrud is employed as an associate professor in the research group for distributed multimedia systems at the Department of Informatics, University of Oslo, Norway.

Prof. Anton Civit
Professor Civit is the director of the Department of Computer Architecture at the University of Seville in Spain. He is author of over 100 publications in the fields of embedded systems, bioinspired systems, robotics and accessibility.

[2] Ms. Bitterman and Prof. Civit had to cancel his participation prior to meeting for work –related reasons. Dr. Civit was substituted by his collaborator Rocío Garcia-Robles.

Prof. Pier Luigi Emiliani
Professor Emiliani works at the Institute of Applied Physics (IFAC) in Florence, Italy. The IFAC Department on Information Theory and Processing is involved in research on the theory and applications of signal and image processing and information technology (communications, biomedicine, non-destructive testing, user interface and aids for disabled persons).

Prof. Cristina Espadinha
Professor Espadinha is a doctor in the area of special education and rehabilitation and is a teacher at the Faculdade de Motricidade Humana at the Technical University of Lisbon, Portugal. She also worked as a junior researcher several European projects, including two of the COST219 actions.

Rocío Garcia-Robles
Ms. Garcia-Robles is a lecturer at the Department of Computer Architecture of the University of Seville. Her publications are mainly related to e-learning standards, accessibility, usability and user-interface design.

Dr. John Gill
Dr. Gill has worked for over 37 years in the area of scientific and technological research for people with disabilities. Based in the U.K. his research has included the design of fonts, public access terminals, tactile communication, orientation systems, automated production of braille and large print, and access to telecommunication systems and services.

Dr-Ing Helmut Heck
Dr. Heck coordinates R&D projects at the Research Institute for Technology and Disability at Evangelische Stiftung Volmarstein, Forschungsinstitut Technologie und Behinderung in Germany. His current interests relate to computer/robotic applications, human-machine-interaction for people with disabilities, accessibility of IT systems, as well as AAL.

Sifis Klironomos
Mr. Klironomos is a member of the Human-Computer Interaction Laboratory and Centre for Universal Access and Assistive Technologies of ICS-FORTH – Hellas, one of the largest research centres of Greece. Laboratory carries out research activities focused on developing user interfaces for interactive applications and services that are accessible, usable, and ultimately acceptable for all users.

Prof. Leonor Moniz Pereira
Professor Pereira is a doctor and teaches in the area of special education and rehabilitation and is the president of the scientific board of Faculdade de Motricidade Humana at the Technical University of Lisbon, Portugal. She is the coordinator of the Interdisciplinary Center of Human Performance, Coordinator of FCT rehabilitation evaluation panel (the national organization that promotes the advancement of scientific and technological knowledge). She also worked as a senior researcher on several European projects including the three COST219 Actions.

Mary Nolan
Ms. Nolan has worked at the CRC for the past four years in the Assistive Technology & Specialised Seating department working on various AT research projects and developing the European Seating Symposium. Prior to joining the CRC, Mary was Head of Group Marketing & Communications at one of Ireland's largest commercial banks, where one of her key roles was to develop the bank's †e-commerce strategy based on key findings from consumer research for disabled and elderly customers.

Prof. Patrick Roe
Professor Roe works with the Acoustic Group of the Laboratoire d'Electromagnétisme et d'Acoustique (LEMA) at EPFL, one of the two Ecoles Polytechniques Fédérales in Switzerland. He worked as a senior researcher on several European projects including the three COST219 Actions, where he acted as Chairman for five years of the COST 219ter Action "Accessibility for All to Services and Terminals for Next Generation Networks".

Contributed to CARDIAC Wikispace, but not present in San Sebastian

Steve Tyler. RNIB (UK)
Mr. Tyler is the Head of Innovation and Development at the Royal National Institute of the Blind.

Edward Chandler. RNIB (UK)
Mr. Chandler is ergonomist at the Royal National Institute of the Blind (RNIB), which has played a central role in the evaluation of products and systems within the Royal National Institute of the Blind for over four years. He has extensive experience in performing expert evaluations, identifying the usability and accessibility issues of complex products and systems; as well as conducting evaluations with disabled end users. He has performed evaluations in Europe and the UK, and has worked with a number of manufacturers to make their products and systems more inclusive. He has worked on a wide variety of projects, including, evaluations of chip and pin devices, Interactive Voice Recognition systems and real time information systems. His current focus is on: mobile email solutions, mobile phones, access to digital TV and evaluation methodologies. Edward holds a Masters in Science in Human Factors in Manufacturing Systems and is a registered member of the Ergonomics Society.

Robert Hecht. PTS (SE)
Mr. Hecht works with the Swedish Post and Telecom Agency and is intimately involved in the process of public procurement.

Participants of the remote sessions

Prof. Julio Abascal
Prof. Abascal is a Professor of the Computer Architecture and Technology Department at the University of the Basque Country located in Northern Spain. He co-founded the Laboratory of Human-Computer Interaction for Special Needs that has participated in several R&D projects at national and international level.

Jon Azpiroz
Mr. Azpiroz is at the R&D Project Management at Fundación Vodafone España.

Ilse Bierhoff
Ms. Bierhoff is a research project manager at Smart Homes, an independent expert centre for smart houses and smart living based in the Netherlands. She graduated as human-technology engineer and has specialised over the past 8 years in user centred design and technology for older persons. Her main activities at Smart Homes are in the field of the use of smart home technology for independent living and more efficient care delivery.

Stephan Carmien
Dr. Carmien holds a Ph.D. In Computer Science with certificate in Cognitive Science from the University of Colorado (Boulder) 2006. He currently holds the position of staff scientist at the

Fatronik?Tecnalia foundation in San Sebastian Spain. Dr. Carmine's work focuses the study of the socio-technological environment formed by a technological system, its context and the human user. In systems he has developed he has emphasized deep personal configuration (meta-design) and end-user programming as a solution to technology abandonment.

Prof. Cristina Espadinha
Professor Espadinha is a doctor in the area of special education and rehabilitation and is a teacher at the Faculdade de Motricidade Humana at the Technical University of Lisbon, Portugal. She also worked as a junior researcher several European projects, including two of the COST219 actions.

Sifis Klironomos
Mr. Klironomos is a member of the Human-Computer Interaction Laboratory and Centre for Universal Access and Assistive Technologies of ICS-FORTH – Hellas, one of the largest research centres of Greece. Laboratory carries out research activities focused on developing user interfaces for interactive applications and services that are accessible, usable, and ultimately acceptable for all users.

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Accepted invitation but unable to attend

Luis Azevedo. Anditec (PT)
Mr. Azevedo is a researcher at the Center for Analysis and Signal Processing, the Technical Institute, Technical University of Lisbon in the area of Assistive Technology. He is the Director of ANDITEC-Rehabilitation Technologies Ltd, a company specializing in marketing, training and development in assistive technologies. His teaching experience includes courses as a Visiting Professor of the Master of Clinical Engineering, Faculty of Engineering, Catholic University, of the Masters in Lusophone University Augmentative Communication, Lecturer's Degree in Occupational Therapy, School of Health Alcoitão, Guest Lecturer for Courses / Seminars on "Assistive Technology for Persons with Disabilities in foreign universities, including Spain, Brazil, Argentina, Chile, Colombia, Ecuador and Costa Rica. He is Scientific Coordinator of National and International Projects in Technologies for Rehabilitation. Invited Expert of the European Commission to evaluate projects in the area of Assistive Technology, Founding member and Board of Directors of the Association for the Advancement of Assistive Technology in Europe (1995 - 1998). He was a member of the Board of Directors of ISAAC - International Society of Augmentative and Alternative Communication (1995 - 2000). Member of the Rehabilitation Engineering Society of North America. Founding Member and Vice President of AITADIS - Ibero-American Association of Assistive Technology. Advisor specialized in the field of Assistive Technology in various Rehabilitation Centres and Hospitals. Author of more than 150 communications to national and international congresses.

José Ángel Martínez Usero. Technosite - ONCE Foundation (ES)
Mr.Usero is currently the Director of International Projects and Relations at Technosite - ONCE Foundation. He holds a PhD in Information Science (Hons) from Madrid's Universidad Carlos III and a MSc in Corporate Networks and Systems and a Postgraduate Course in Information Science. At present, José Angel Martínez is the Director of international projects and relations at Technosite-ONCE Foundation (Spain). He is the project coordinator of two major European studies, "Monitoring eAccessibility in Europe" and "Economic Assessment for Improving eAccessibility Services and Products"; and two major ICT-PSP projects in the field of eInclusion APSIS4all European pilot on Accessible and Personalised Public Digital Terminals for all and ATIS4all, Thematic Network on Assistive Technologies.

Cristina Rodríguez-Porrero. CEAPAT (ES)
Ms. Rodríguez-Porrero is the Managing Director of CEAPAT, National Centre for Personal Autonomy and Technical Aids under the National Institute for Migrations and Social Services IMSERSO. Its mission is to contribute to improving the quality of life of all citizens, with special support to people with disabilities and elderly people, by means of accessibility, design for all and assistive technology.

Steve Tyler. RNIB (UK)
Mr. Tyler is the Head of Innovation and Development at the Royal National Institute of the Blind.

Edward Chandler. RNIB (UK)
Mr. Chandler is Ergonomist at the Royal National Institute of the Blind (RNIB), which has played a central role in the evaluation of products and systems within the Royal National Institute of the Blind for over four years. He has extensive experience in performing expert evaluations, identifying the usability and accessibility issues of complex products and systems; as well as conducting evaluations with disabled end users. He has performed evaluations in Europe and the UK, and has worked with a number of manufacturers to make their products and systems more inclusive. He has worked on a wide variety of projects, including, evaluations of chip and pin devices, Interactive Voice Recognition systems and real time information systems. His current

focus is on: mobile email solutions, mobile phones, access to digital TV and evaluation methodologies. Edward holds a Masters in Science in Human Factors in Manufacturing Systems and is a registered member of the Ergonomics Society.

Robert Hecht. PTS (SE)
Mr. Hecht works with the Swedish Post and Telecom Agency and is intimately involved in the process of public procurement.

Dr. Noemi Bitterman (IL) (from CARDIAC Consortium)
Dr. Bitterman is the head of industrial design in the Faculty of Architecture & Town Planning at Technion - Israel Institute of Technology, Israel's primary technological university. The research interests of her group include "Social Design"- addressing the needs of special populations, such as elderly, disabled and the ill.

External experts collaborating in the pre-seminar discussions

Some experts have committed themselves to participate in the pre-seminary discussions and preparations through the SDDP2 wiki at http://www.cardiac-eu.org/user_interfaces/. Brief information about collaborating experts is provided below.

Collaborating Experts

Shadi Abou-Zahra. WAI
Mr. Abou-Zahra coordinates WAI outreach in Europe, and accessibility evaluation techniques. He is the Activity Lead of the WAI International Program Office, which includes groups that are responsible for education and outreach, coordination with research, general discussion on Web accessibility, coordination with the WAI Technical Activity, and WAI liaisons with other organizations including standards organizations and disability groups. Mr. Shadi chairs the W3C Evaluation and Repair Tools Working Group (ERT WG), is a staff person of the WAI Ageing Education and Harmonisation (WAI-AGE) project, and participates in the W3C Education and Outreach Working Group (EOWG).

Robert Hecht. PTS
Mr. Hecht works with the Swedish Post and Telecom Agency and is intimately involved in the process of public procurement.

CARDIAC Scientific Advisory Board

Prof. Ricardo Baeza-Yates. Yahoo.
Professor Baeza-Yates is the VP of Research for Europe and Latin America, leading the Yahoo! Research labs at Barcelona, Spain and Santiago, Chile, and also supervising the lab in Haifa, Israel. Until 2005 he was the director of the Center for Web Research at the Department of Computer Science of the Engineering School of the University of Chile; and ICREA Professor and founder of the Web Research Group at the Dept. of Information and Communication Technologies of Univ. Pompeu Fabra in Barcelona, Spain. He maintains ties with both mentioned universities as a part-time professor for the Ph.D. program. His research interests include algorithms and data structures, information retrieval, web mining, text and multimedia databases, software and database visualization, and user interfaces.

Chiara Giovannini. ANEC
Ms. Giovannini holds Bachelors and Masters degrees in law. She is Research & Innovation Manager, responsible for the management of the ANEC research & testing projects as well as the sectors of Design for All and Information Society.

Hiroshi Kawamura. DAISY
Mr. Kawamura is the chairperson of the DAISY Consortium. Previously he was a director of the Department of Social Rehabilitation/NRCD Research Institute. Prior to that he was Director of the Information Center, Japanese Society for Rehabilitation of Persons with Disabilities.

Peter Korn
Mr. Korn is the Sun Microsystems' Accessibility Architect and Sun' primary representative to the US Access Board Telecommunication and Electronic and Information Technology Advisory Committee. Mr. Korn co-chairs the OASIS OpenDocument Accessibility subcommittee. He helped design and implement the Java Accessibility architecture, and he also developed technology that allows assistive technologies for the Microsoft Windows platform to access Java applications. Mr. Korn is one of the designers of the open source GNOME Accessibility architecture used on Solaris, GNU/Linux, and other UNIX systems. He consults with the Star Division of Sun Microsystems in Germany on the development of an accessible edition of the StarOffice and OpenOffice.org suite of application productivity suite, with the Mozilla and Evolution accessibility teams, as well as other software application groups both within and outside of Sun. Prior to his work at Sun, Mr. Korn spent five years in the assistive technology field at Berkeley Systems, Inc., inventors of the first graphical screen magnification and screen reading technologies. There, he designed the first cross-platform Accessibility toolkit, lead the team which developed outSpoken for Windows - a Windows screen reader for the blind - and managed the development of several other assistive technology products for the Macintosh and Microsoft Windows. Mr. Korn successfully transitioned these access technologies to ALVA BV in the Netherlands, and assisted them in setting up a US subsidiary. His most recent previous position was that of President of the Berkeley Access division of Berkeley Systems.

Prof Zhengjie Liu
Professor Liu is the Founder and Director of Sino European Usability Center (SEUC), Professor at School of Information Science & Technology of Dalian Maritime University (DMU), Director of NCR-DMU HCI Research Center, Co-founder and Co-chair of ACM SIGCHI China. Former Chinese National Representative (1999-2005) to IFIP TC.13 Committee on Human-Computer Interaction. His areas include usability/user experience, user-centered design (UCD), accessibility and human-computer interaction (HCI).

Dr. Mathijs Soede. AAATE
Dr. Soede is a founder of the Association for Advancement of Assistive Technology in Europe and first president of the AAATE. Editor of the AAATE's Journal "Technology and Disability". Chairman of the AAATE2011 conference, 30 Aug – 2 September 2011, in Maastricht. Background is in human factors (Cybernetic Ergonomy) The focus in his career is on technology for enhancing independence and participation of persons with a disability. Subjects of R&D has been Innovation stimulation in Assistive Technology, Communication aids for speech and motor impaired persons, Robotic Manipulators, Interfaces and accessibility and finally involvement of end-users in Standardization. Main positions have been at the Delft University of Technology, TNO Organization for Applied Scientific Research-Delft, iRv-Institute for Rehabilitation Research-Hoensbroek as managing director and at present a part-time professorship at the Zuyd University for professional education-Heerlen.

ANNEX III: Ideas generated of Wiki ahead of meeting

Ideas Generated before the SDD in San Sebastian (in order of posting and numbers as on Wikispace)

1. Adaptive interfaces (John)
2. Global Public Inclusive Infrastructure (John)
3. Universal Remote Control (John)
4. Speed of Use (John)
5. Adaptive interfaces with company touch (Robert)
6. Human - Machine and Human – Human (Robert)
7. Minimum set of functionality (Robert)
8. Personalization and open interfaces (Robert)
9 HCI and Medical Devices - The Gap (Mary-MN3)
10. Tools for decision making in the user centred design process (Ilse)
11. Universal access in ambient intelligence environments (Brings)
12. Accessible user interaction in "smart environments" (Sifis)
13. Think broader than HCI; think HEE (Herjan)
14. How inclusive is social media? (Ilse)
15. Research on the role of inclusive HCI to support self management in healthcare (Ilse)
16. Research on inclusive HCI for highly dynamic impairments (Ilse)
17. Inclusive 3D interfaces (Ilse)
18. Standards for Accessibility (Tim)
19. New design methodologies for accessible user interfaces (Julio)
20. Guidelines and tools for UI accessibility manual and automatic evaluation (Julio)
21. Promote research in eye tracking based interfaces (Julio)
22. Promote the definition or adoption of a common/standard middleware as accessible interoperability framework (Julio)
23. Inclusion of universal accessibility requirements and methodologies in mainstream commercial UI development tools (Julio)
24. Promote research in BCI if and only if it is specifically focussed to people with disabilities and tested with real users (Julio)
25. Continue to support research on means of controlling interfaces (Patrick)
26. Support research on user profiling (Patrick)
27. Support research on the ethics of embedded tools collecting personal user information (Patrick)
28. Support research on gathering further understanding of user behaviour and interaction with machines (Patrick)
29. Continue to support research on brain-machine interfaces (Patrick)
30. Support research on implants that enhance brain/cognitive function (Patrick)
31. Support research on the implications for people with disabilities of the use of biometric systems for identification and security (Patrick)
32. Support research in assistive communication technologies (Patrick)
33.Support research on self-configurable user interfaces (Patrick)
34. Continue to support research regarding interaction with robots (Patrick)
35. Support research regarding the extraction of knowledge about the activities of the user from low-level sensor data (Patrick)
36. Support research in assistive communication technologies (Patrick)
37. Support research on emotional interaction (Patrick)
38. Support research on novel usable human-machine interfaces for recreational activities (Patrick)
39. Support research on novel interfaces for musical instruments (Patrick)
40. Support research that looks into how to reduce the complexity of user interfaces whilst retaining their functionality (Patrick)
41. Support research on the development of assistive and adaptive user interfaces (Patrick)
42. Interface design: Input and output (Steve/Edward)
43. Interface design: Usable Accessibility (Steve/Edward)
44. Interface design - knowledge of computer paradigms (Steve/Edward)
45. Ubiquitous Computing and Programming Tools (Eddie)
46. Even the price of Assistive Technologies (Cristina)
47. Facilitate the creation of digital and text materials accessible to non-accessibility expert professionals (Cristina)
48. Take the "human side" in the design of human-machine interfaces more serious (Helmut)
49. Avoid to build up mental/cognitive barriers in the design of HMI (Helmut)
50. Create development environments for accessibility solutions (Gregg)
51. Research on Evaluation Wizards (Gregg)

52. Mechanisms for International Collaboration in access Research and Development (Gregg)
53. Research on how to make accessibility simpler to deliver, apply, configure, support, and use (Gregg)
54. Ways to lower the barriers faced by new AT developers (Gregg)
55. Development of sophisticated adaptive brain-computer interfaces (Brings)
56. Development of new haptic interfaces (Brings)

ANNEX IV: 2nd round voting results

Voting Results on Mechanisms that received 1 vote

25: *(11 Votes)* Research on who could be excluded from using novel user interfaces [John]
74: *(8 Votes)* Support research on accessible interaction with robots [Patrick]
5: *(8 Votes)* Development of practical adaptive user interfaces [John]
39: *(5 Votes)* Promote ubiquitous computing and programming tools [Sifis-Eddie]
70: *(5 Votes)* Research on how to make accessibility simpler to deliver, apply, configure, support and use and explain to policy makers [Gregg]
75: *(5 Votes)* Create development environment for accessibility solutions [Gregg]
12: *(5 Votes)* Promote research on the role of inclusive HCI to support self-management in health care [Mary-Ilse]
23: *(4 Votes)* Development of sophisticated brain-computer interfaces for people with special needs [Kjell]
54: *(4 Votes)* Research on how to increase and widen accessibility in professional education [Ginger]
34: *(3 Votes)* Research on how to enforce accessibility in consumer goods [Ginger]
36: *(3 Votes)* Non-visual interfaces for all (mainstreaming of non visual computing) [Adamantios]
55: *(2 Votes)* Identify human factors barriers to health, education and participation of low income groups [Simon]
31: *(2 Votes)* Promote research into the cost of eye-tracking and tongue piercing based interfaces [Mary]
20: *(1 Votes)* Create a paradigm that avoids the traps of either forcing all to use a single new technology or for all content to be rewritten (interesting to study the growth of the web) [Stefan]
28: *(1 Votes)* Research about the exclusion that has been created by HCI [Leonor]
37: *(1 Votes)* R&D on text normalization, simplification, personalization and evaluation [Roberto]
48: *(1 Votes)* Create a meaningful use of HCI clearly supporting activities [Leonor]
1: *(1 Votes)* Research to get rid of HCI [Pier-Herjan]
17: *(0 Votes)* Research and development on provision of accessible interfaces inclusive products and services in an ubiquitous manner [Roberto]
49: *(0 Votes)* Research that promotes inclusive practices of professionals responsible to develop new products or services [Cristina]

Leading Partner

ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE (EPFL) Switzerland

CARDIAC Consortium

No	Name	Country
1	ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE (EPFL)	Switzerland
2	CENTRAL REMEDIAL CLINIC (CRC)	Ireland
3	Cyprus Neuroscience and Technology Institute (CNTI)	Cyprus
4	UNIVERSIDAD DEL PAIS VASCO (UPV/EHU)	Spain
5	CONSIGLIO NAZIONALE DELLE RICERCHE (CNR)	Italy
6	EVANGELISCHE STIFTUNG VOLMARSTEIN (FTB)	Germany
7	JOHN GILL TECHNOLOGY Ltd (JTG)	UK
8	STICHTING SMART HOMES (SMH)	Netherlands
9	UNIVERSITETET I OSLO (UIO)	Norway
10	TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY (IIT)	Israel
11	FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS (ICS-	Greece
12	UNIVERSIDAD DE SEVILLA (USE)	Spain
13	FACULDADE DE MOTRICIDADE HUMANA (FMH)	Portugal

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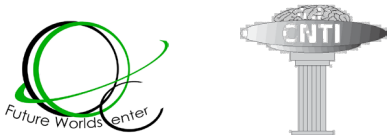

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CARDIAC

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