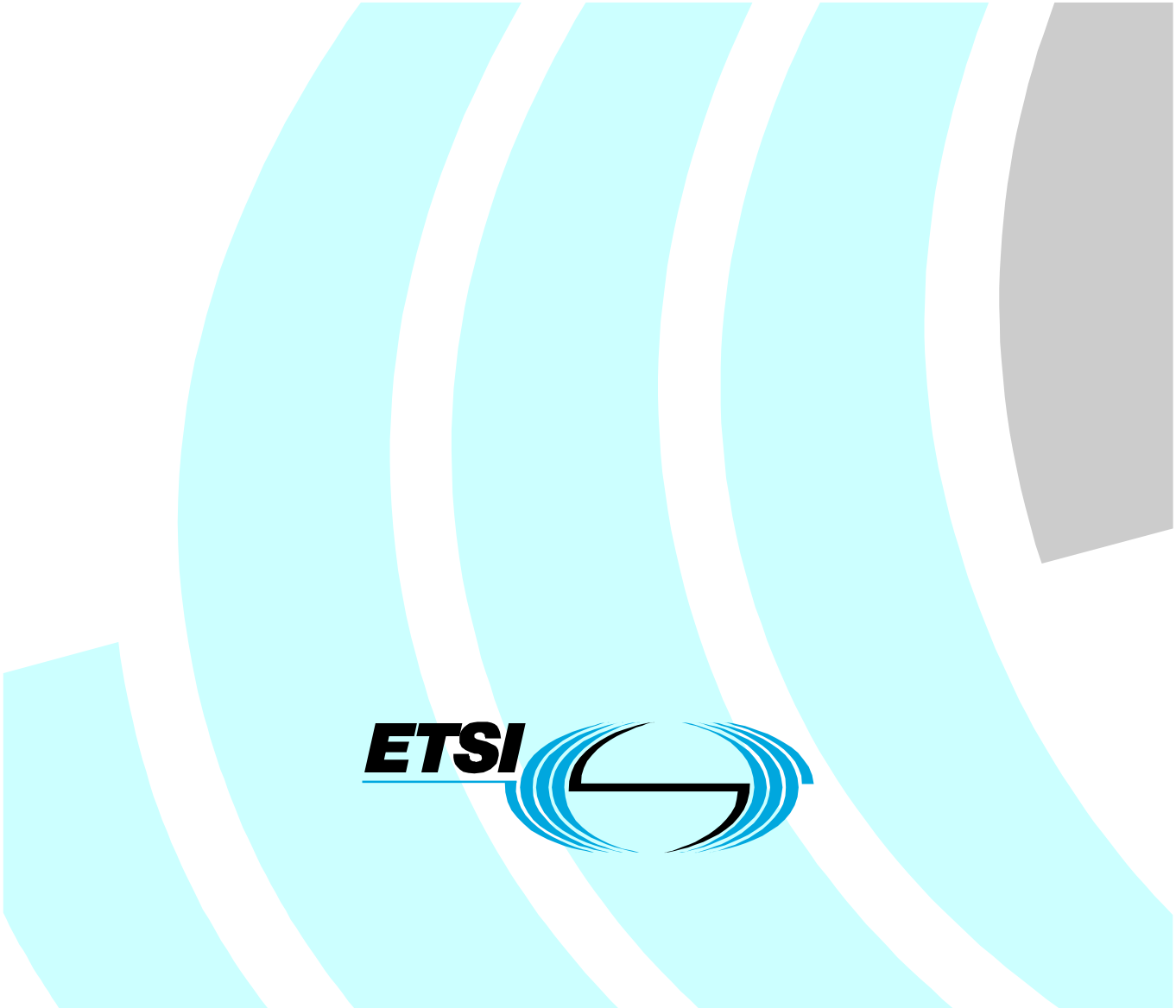
ETSI TR 103 073 V1.1.1 (2003-11)

Technical Report

Universal Communications Identifier (UCI); Improving communications for disabled, young and elderly people



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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Human Factors (HF).

Introduction

User requirements for Universal Communication Identification (UCI) based services have been specified in EG 201 940 [3]. The technical implications of implementing these user Requirements were reported in EG 202 067 [5]. The impact of UCI systems in improving the usability of communications has been described in TR 103 077 [7].

One specific area of usability identified in TR 103 077 [7] has been the consideration of features of UCI systems which might be used to improve communications both for people with various functional impairments (e.g. people with different disabilities and some elderly people) and also for young people (up to 12 years of age).

There are aspects of UCI systems that would appear to offer significant potential for improving communications for these groups of users.

The current document describes the most important communication requirements related to disability, ageing and young people and the method by which they were determined. An adapted version of the taxonomy of EG 202 116 [6] was used to ensure the inclusion of a representative sample of organizations in the consultation process so that the requirements would be as comprehensive as possible. Particular attention has been given to requirements related to access for people in the workplace and to ease of contacting emergency services.

Representative international and national user groups were consulted in the preparation of the current document. Input from these groups, using face to face interviews and questionnaires, has been used to ensure that the any proposals made represent practical approaches to addressing the most important communication problems experienced by each group. Groups targeted have been identified using the taxonomy.

Priorities for the different communication problems have been taken from the various user groups consulted.

Recommendations on these issues will be the subject of an ETSI Guide.

1 Scope

The present document reports on the use of UCI systems to improve communications for disabled, young people (up to 12 years of age) and elderly people. In addition the present document reports the process that was used to determine the important communication usability issues identified by means of consultations with key stakeholders (e.g. groups representing disabled people, elderly users and young people up to 12 years of age) and more widely distributed questionnaires. Current communication barriers and problems experienced by these groups, derived from the consultations and questionnaires are highlighted. These issues form the basis for identifying where UCI solutions to the communication problems are needed.

It takes those issues relevant to accessibility already identified in previous UCI documents [3], [5] and [7] and considers them in relation to the material in the ETSI Guidelines for ICT Products and Services: "Design for All" document [6].

The present document includes a taxonomy of the most relevant disabilities and effects related to ageing and young people that could be addressed by UCI systems. This taxonomy established a framework for ensuring that a comprehensive range of stakeholders were consulted.

2 References

For the purposes of this Technical Report (TR), the following references apply:

[1] CEN/CENELEC Guide 6: "Guidelines for standards developers to address the needs of older persons and persons with disability".

[2] ETSI EG 201 472: "Human Factors (HF); Usability evaluation for the design of telecommunication systems, services and terminals".

[3] ETSI EG 201 940: "Human Factors (HF); User identification solutions in converging networks".

[4] ETSI TR 102 133: "Human Factors (HF); Access to ICT by young people: issues and guidelines".

[5] ETSI EG 202 067: "Universal Communications Identifier (UCI); System framework".

[6] ETSI EG 202 116: "Human Factors (HF); Guidelines for ICT products and services; "Design for All"".

[7] ETSI TR 103 077: "Universal Communications Identifier (UCI); Maximizing the usability of UCI based systems".

[8] Roe, Patrick R. W. (ed.) (2001): "Bridging the GAP? Access to telecommunications for all people", The Commission of the European Communities.

[9] "Eurostat yearbook 2003 - The statistical guide to Europe - Data 1991-2001", The Statistical Office of the European Communities, Luxembourg.

[10] Katz and all (1997): "Public attitudes to towards voice-based electronic messaging technologies in the United States: a national survey of opinions about voice response units and telephone answering machines", Behaviour and Information Technology, Vol. 16, No. 3, 125-144.

[11] Dulude, Louise (2002): "Automated telephone answering systems and aging", Behaviour and Information Technology, 2002, Vol. 21, No 3, 171-184.

[12] ETSI ETR 329 (ed.1 (1996-12)): "Human Factors (HF); Guidelines for procedures and announcements in Stored Voice Services (SVS) and Universal Personal Telecommunication (UPT)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

Universal Communications Identifier (UCI): descriptor which provides a single identifier for all personal communications

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

CLI	Calling Line Identification
ICT	Information and Communications Technology
ISDN	Integrated Services Digital Network
PUA	Personal User Agent
SA	Service Agent
UCI	Universal Communications Identifier

4 Background

4.1 The benefits of UCI with evolving network architectures

Implementation of UCI systems as proposed in [1] and [2] will overcome the many limitations that arise from the use of the current identifiers in today's communications systems. When the UCI is used within a supporting network architecture it will:

- support the fundamental generic user requirements for communication (see annex A);
- identify the user not the terminal or service;
- avoid the need to have many different identifiers for a range of different communications services;
- provide the potential for verifying the true identity of the originator or recipient of a communication;
- remain unchanged when moving to a different service provider or service type;
- provide a common environment for the management and control of all personal communications irrespective of service type (as opposed to a range of different control mechanisms that are service specific);
- allow user profiles to be set up to provide comprehensive management of outgoing and incoming communications.
- ensure that any special requirements are automatically catered for with both incoming and outgoing communications.

In a UCI system, every user has at least one UCI each with an associated Personal User Agent (PUA). For every service used, the user has an associated Service Agent (SA). This is described in clause 4.1.3.

4.1.1 The Universal Communications Identifier (UCI)

The UCI is a single, unique identifier for a user. It consists of an alphanumeric part, a numeric part and an additional information field (not directly seen by those making or receiving communication). It is only the numeric part of the UCI that is unique and hence it is this that uniquely identifies the user. The UCI would be allocated by a trusted authority and be stable, i.e. it would not change over time even with a change of service provider.

e.g. John Smith[8837460633789]<a6;f1;d234;k78>

Some of the key characteristics of the UCI are:

- it is a unique identifier for a person, role or organization;
- it allows a "user-friendly" name to be used as a label which describes the originator and/or recipient of a communication;
- it allows important additional information to be available to anybody using it such as preferred media, acceptable languages, whether business/personal, label authenticity or alias, etc;
- it allows the originator or recipient of a communication to claim authenticity for their identifier;
- where it is particularly important to verify the claimed authenticity, additional procedures can be invoked to make sure that it is not another person accidentally or intentionally making use of the UCI;
- it is independent of services and networks;
- it is independent of service providers.

4.1.2 The Personal User Agent (PUA)

A PUA is an entity external to the main communication networks and with a one-to-one relationship to a specific UCI. It stores, or has access to, information on all of a user's communication services and their service identifiers (e.g. telephone numbers, email addresses, etc.). The PUA also stores, or has access to, current state and personal preferences information in relation to all communications services. These preferences (or user profile) would consist of access, filtering and redirection rules which could operate on a wide range of factors including:

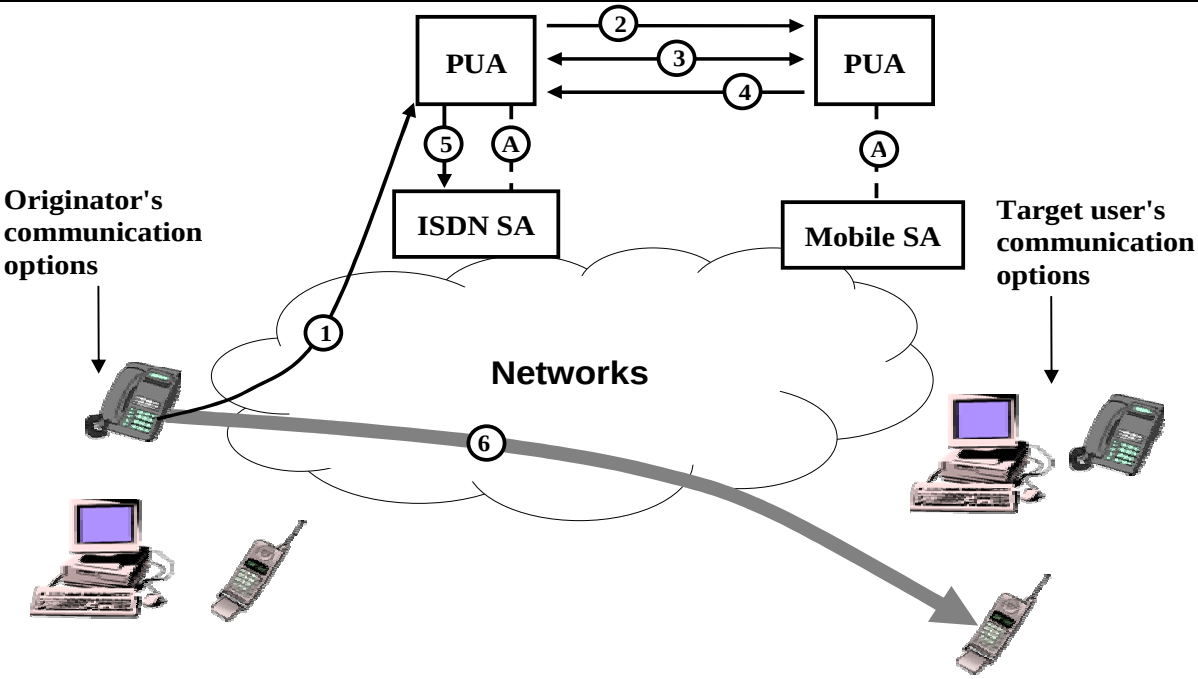
- the identity (UCI) of people attempting to communicate with the user or with whom the user is trying to communicate;
- the date and time when communication is attempted;
- the location of the user;
- the urgency of the communication;
- whether the originator of a communication has a business or a personal status;
- the user's preferences for how they wish to be reached (which services and which terminals) or how they wish to contact others.

The operation of these rules can permit a very high degree of control over the user's communications. EG 201 940 [3] gives some scenarios illustrating the potential power and flexibility of UCI-based communication. Further, more detailed, examples and scenarios are given in EG 202 067 [5].

4.1.3 The Service Agent (SA)

An SA is an interface between a PUA and a communication service (or network). It would typically be provided by a network or service provider. An SA is the link between the main UCI system and networks and services. It communicates with PUAs, other SAs and its own network/service and would be specially trusted by PUAs following successful registration.

4.1.4 The UCI in operation



The originator requests a voice call to the target user:

A - Each PUA exchanges information with the SAs of its users networks/services before, during and after communication attempts take place. The target user's PUA knows that the user's mobile phone is able to receive voice calls.

1 - The originating user enters the UCI of the target user
2 - The originating PUA makes a request to the PUA of the target user
3 - The PUAs negotiate communication options if necessary
4 - The target user's PUA takes account of its user's preferences and proposes the user's mobile phone to receive the call
5 - The originator's PUA instructs the originator's network to set-up the call
6 - A voice call between the originator's ISDN phone and the target user's mobile phone is established

Figure 1: Simplified overview of UCI operation

4.1.5 Some UCI benefits relevant to disabled, elderly and young people

The first benefit of UCI is that, instead of connecting a terminal with another terminal, a UCI system is aware of the identity of both originator and recipient. It is therefore possible for the system to be aware of special requirements that either originator or recipient (or both) may have. This could result in specific terminals, services or networks being used to set up the communication or the automatic invocation of network based services.

The second is that the UCIs "additional information field" can also highlight special requirements relating to the UCI holder. This field carries information which can be placed in the address book of anyone its user communicates with. These special requirements can be presented to the originator of a communication before they attempt connection. This allows them to take special measures to ensure successful communication. The special requirements alluded to above could be almost anything that will help the originator in setting up a successful communication.

Finally, it will be possible, when using UCI systems, to present an "authorized" and trustworthy delivery label with each communication. This means that the recipient can be confident that the communication is from the person or organization that it claims to be from.

Implementation of UCI based systems will improve the quality and usability for most users. This improvement will be especially apparent to those with special communications needs. The potential is there to deliver communications which:

- can authenticate the name, age or gender of the sender of a communication;
- automatically use appropriate media for the communication;
- automatically invoke network services;
- implant special communications requirements in the address books of contacts.

The purpose of the current study has been to investigate how these system capabilities map onto the requirements the various groups consulted.

4.2 The need for a "Design for All" approach

Official European statistics [9] show that there are over 375 million people in the 15 countries of the European Union. At any point in time, the number of people in the European Union directly affected by some form of disability has been estimated at around 20 % of the total population [6]. Older people are an equally significant sector of the population: over 77 million - 20 %, or one in five - are 65 [8] years of age or more. And as a consequence of the demographic change which is happening throughout Europe, this proportion is constantly increasing.

Children (12 years and younger) are becoming an increasingly significant consumer group for advanced computing and communications services. In some cases children as young as two or three years old are using ICT equipment. Children are often expected to use equipment designed for adults that has inappropriate physical and cognitive ergonomics for their needs. The difficulty of access that this causes for this group can act as a barrier to the benefits of computing and communications services, as well as causing unnecessary physical and psychological stress through poor workstation/product design.

Children, as ICT users, are in most aspects differently able than their adult counterparts. Only if their abilities, needs and requirements are studied, understood and differentiated, can efficient, understandable and accessible ICT solutions be offered.

The challenge in providing guidance on designing for children is complex, because depending on how we define "children", the interfaces may or may not be supportive of their relevant cognitive, social, or physical skills and capabilities at a certain stage.

Any "Design for All"- approach from now on must include the youngest users, taking account of their different abilities and requirements.

It is important, therefore, that any developments in providing UCI services should consider the needs of the young, of older people and of people with disabilities. The UCI should be able to ensure that these groups are helped and not marginalized by the system.

The Design for All approach in the development of technological products and services also generally makes them easier to use for everyone else, besides maximizing the possibility of having a product accessible to older people and people with disabilities.

There is an enormous diversity among users' physical, cognitive, sensorial, dimensional and cultural characteristics. Users evolve throughout their lives and their abilities and attitudes change with time. From a state of total dependency when they are babies, they move to one of interdependency with people and their environment that enables them to enjoy distinct degrees of autonomy throughout their lives, depending on their age, individual abilities and capacities, their responsibility for other people, their economic capacities etc. Their dependency on others varies throughout their life cycle. At birth, babies are totally dependent on their surroundings; adults of 40 have parents and children dependant on them to varying degrees; then, as they get older, they tend to become increasingly dependent on others. See figure 2.

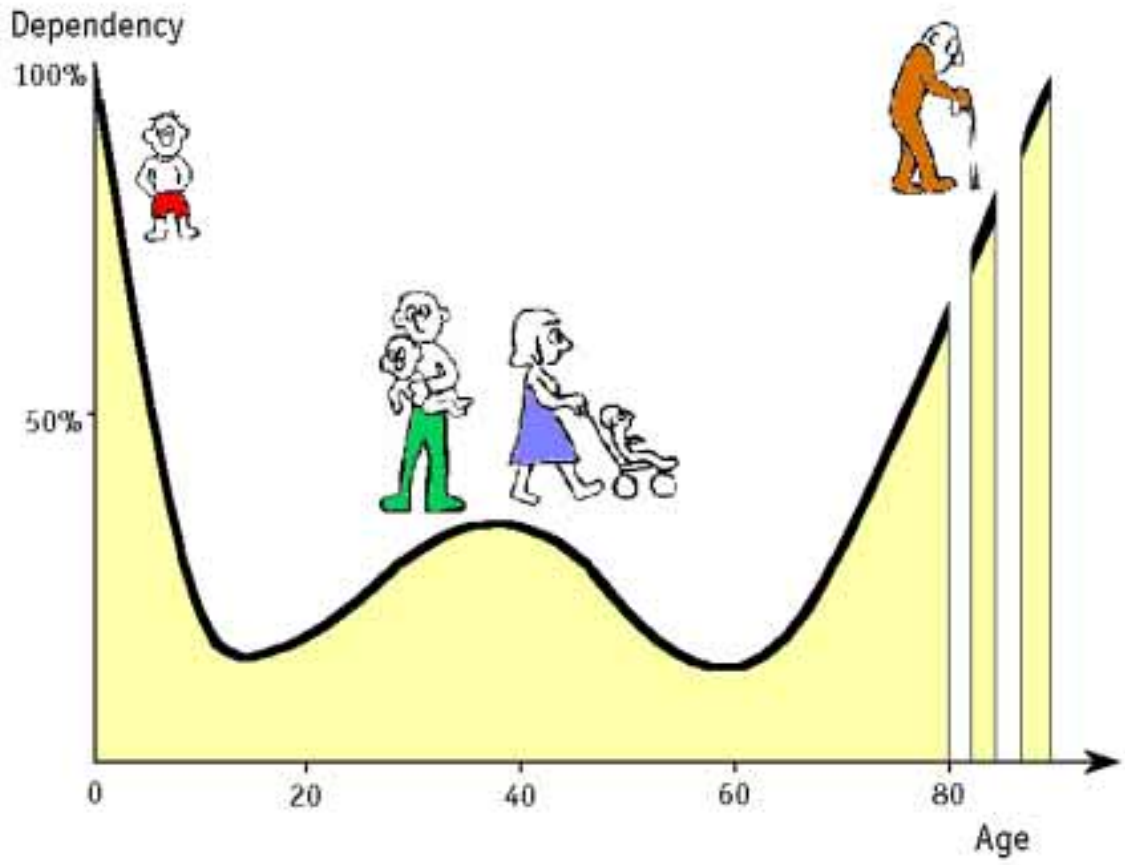


Figure 2: Dependency on others as a function of age

4.3 Changes of relevant user characteristics

Older people generally widen and skew the distribution of a given human characteristic. Some of them will experience a change or degradation of that characteristic. In general, most functional abilities will change. For example, older people tend to lose their ability to detect higher frequency sounds and many use a hearing aid. The incidence and severity of visual impairment increases with age and the changes in the physical structure of the eye will lead, among other effects, to loss of visual acuity (the ability to see fine detail), the inability to accommodate changes of focus from short to long distances and a loss of speed of adaptation to changing light levels. Manual dexterity, mobility, strength and endurance also decline. These effects are often accompanied by a slowing of the brain's ability to process information, causing difficulty in taking in, attending to and discriminating between multiple sources of sensory information. This has the effect of causing an overall slowing of "behaviour" and the phenomenon which is generally referred to as "loss of memory". It should be noted that the "normal" changes related to ageing are usually not regarded as disabilities, even though the impairments incurred by ageing may be indistinguishable from those of younger people with disabilities.

The development of children is a progressive process of anatomical and behavioural, development. Some aspects of the orderly progression of development are determined by maturation, genetically pre-programmed and independent of specific environmental conditions (e.g., walking). Children's physical size and development is one of the basic obstacles to convenient use of ICT devices and services. Typically, children will have their first user experience with computer and telephone hardware designed and sized for adult users.

Recognizing the variance in ability across a sample of population, there is clearly a point at which ability becomes so far from the expected range for the population that it has to be considered outside (above or below) the expected range. Disability, by its definition, occurs where some ability falls below the expected range. Population figures on disability are, however, very difficult to collect because of difference between the various national views of the onset of disability and the differing methods of collecting national statistics.

5 The requirements capture process

5.1 Methodology

In order to establish what features could be incorporated into the UCI to aid the differing needs of the chosen groups of users it was felt that it was important to elicit as many user requirements as possible. To ensure that all issues were addressed, a taxonomy was developed based on information from EG 202 116 [6] and TR 102 133 [4]. This helped shape an open-ended interview structure that was used for one to one in-depth interviews. The results from these interviews formed the basis of 3 email questionnaires that were developed for wider consultation.

5.2 Taxonomy of key user characteristics/issues for UCI consideration

There are a large number of attributes that can be used to distinguish between people in a population. The ones that were considered to have direct impact on the Universal Communications Identifier (UCI) include:

- **Sensory abilities** such as seeing, hearing, touch, taste, smell and balance.
- **Physical abilities** such as speech, dexterity, manipulation, mobility, strength and endurance.
- **Cognitive abilities** such as intellect, memory, language and literacy.
- **Social issues** such as dependency on others, individual and social commitments
- **Environment** such as location and context of use, hostile environments.

The individual user may have excellent ability in some areas and yet be poor in others. For the population as a whole there can be a wide variability in any one attribute. The complexity of the problem increases dramatically as more attributes are considered.

With regard to the 3 groups under consideration, all these areas are important. What differentiates the groups is that for children the attributes are all developing, for older people they are all in decline and people with disabilities may have a disability in one or more attribute. These factors are summarized in table 1.

Table 1: Key user characteristics

Specific young person factors	Specific older person factors	Specific disability factors
Sensory development/decline/disability		
Sight	Sight	Sight
Hearing	Hearing	Hearing
Touch	Touch	Touch
Taste and smell	Taste and smell	Taste and smell
Balance	Balance	Balance
Physical development/decline/disability		
Speech		Speech
Dexterity/Co-ordination	Dexterity/Co-ordination	Dexterity/Co-ordination
Manipulation	Manipulation	Manipulation
Mobility	Mobility	Mobility
Strength and endurance	Strength and endurance	Strength and endurance
Cognitive development/decline/disability		
Intellect	Intellect	Intellect
Memory	Memory	Memory
Language/literacy and communication skills		Language/literacy
Discrimination between reality and fantasy		
Ability to take the viewpoint of others		
Logical thinking and abstraction, understanding causal relationships		
Social development/decline/issues		
From dependence to autonomy	Dependency on others	Dependency on others
From family to peer-group as primary reference		
Balancing individual needs and social commitments		
Environment		
Is it friendly or hostile to the target group	Is it friendly or hostile to the target group	Is it friendly or hostile to the target group
Location and context of use	Location and context of use	Location and context of use
		Allergies

5.3 In-depth Interviews

Specialists in the separate fields of the elderly, young children and people with disabilities were selected for interview and 19 interviews were conducted. The aim of these interviews was to explore current problems/barriers/issues that the target groups have with current communication devices, and to explore whether aspects of the UCI could solve some of these problems.

Before the interview took place a leaflet outlining the concepts behind the UCI was sent by post to the interviewee. In addition a short presentation was made using PowerPoint slides at the start of the interview. Following this the interviewer explored current problems/barriers/issues that the interviewee felt that their target group would have in relation to the following areas:

- Identification and privacy.
- Trust, falsified identity.
- Unsolicited communications.
- Accessibility.
- Unusable/difficult to use communication methods.

In addition the interviewer tried to establish how the groups currently coped with these situations.

Although the open-ended interview form had been structured under the headings above, many interviewees would cross the boundaries, when discussing issues. This was not seen as a problem as long as all the areas had been covered. A list of prompt words was used to aid the interviewer. The result however, was that the contents of the interview needed to be transcribed into the headings after the interview. It was noticeable after conducting a few of these interviews that consistent issues were being reported.

5.4 Questionnaires

In order to obtain wider views on the issues that were highlighted, questionnaires for the three groups were developed. The purpose of the questionnaires was to confirm whether or not the issues raised in the interviews found a level of general support, or whether they were one person's unique outlook. The structure of the questionnaires was kept consistent for each group to help in the transformation of the results into UCI solutions.

The questionnaires focussed on the communications issues that were felt to be important for each group. Statements were produced, with the respondent having to mark whether they felt that it applied to most, many, some, few or hardly any of the group, an example is given below:

Young children have difficulty making a phone call because they:

a) Find it difficult to perform the sequence of steps required to make the call.

This applies to:

most	many	some	few	hardly any	young children

Comment (optional):

In order to obtain as many responses as possible, the questionnaires were successfully sent out electronically to 101 e-mail contacts that had been drawn up. Questionnaires were sent to a further 9 email addresses but these, and a few attempts at some of the people who were eventually reached, were rejected as the email addresses were invalid. Having checked that the email addresses used were correct when mailed less than a year ago, it is clear that the recipients had changed their email addresses since the previous mailing. This is an interesting irony in a project that is looking to eliminate the problem of contact addresses that may totally fail to work after a number of years (such as email addresses). The breakdown of questionnaires that were directly sent was:

- 70 questionnaires relating to children;
- 47 questionnaires relating to elderly people;
- and 50 questionnaires relating to people with disability.

See annex B for a list of the organizations consulted.

Onward re-distribution of the questionnaire was requested and this occurred on a number of occasions. For the background information relating to the UCI, a pointer was given in the accompanying email to an electronic version of the leaflet at http://www.eeurope-standards.org/brochures.htm with an option of sending a copy electronically or by post if required.

A total of 42 responses were received. These were distributed as follows:

- 11 questionnaires relating to children;
- 7 questionnaires relating to elderly people;
- and 24 questionnaires relating to disability.

Examples of the questionnaires used (with response totals entered in the answer boxes) are shown in annex C.

The distribution of responses and content analysis of the comments from the questionnaires confirmed and gave a deeper understanding of most of the issues raised in the interviews. The analysis also highlighted further interesting issues.

5.5 Comment on interviews and questionnaires

Some respondents commented that, because of the wide variation in Children's abilities over the chosen age range (0 to 12 years), it proved difficult to answer some of the questions on the questionnaire. However, where respondents had specific knowledge of particular age groups they often qualified their responses with information related to specific groups.

The same can also be said to be true for the elderly. Are "elderly" people those over retirement age (which is different for men and women and different in different countries). There are large differences between a person who has just retired and who is physically and mentally active and somebody who is 80 and does not have all their own faculties. Should these all be grouped as "the elderly".

At the outset of the study, no attempt was made to define what was meant by "the elderly"? The questionnaires were sent to organizations or individuals that represented "the elderly" and therefore the interpretation of what people they described was left to those completing the questionnaires.

On studying the response to the questionnaires it became apparent that the elderly are not a coherent group. Effects on a person's communication as they become older relate to the onset of specific impairments to their abilities (e.g. diminishing levels of vision and hearing) and these effects are not consistently associated with a particular age.

Taking account of all the above factors, it is possible to argue that no generalized statements should be made about children, elderly or any disabled group, as they are all individuals with different capabilities. This is the problem with all human factors - people are different. The conclusion that can be drawn is that any recommendations made about a group of users needs to be carefully worded to allow for the fact that there will be large variations between individuals within that group.

With current technology and the widespread use of email, questionnaires tend to be sent out by email. However, this can cause a problem with the interaction with email services that are designed to remove spam email. For example, some systems will not accept emails from unknown persons and this may have affected the individual mailings that were sent to the initial recipients. Filtering of emails that are "blind copied" to a group of recipients (as was done on a secondary mailing to the recipients) may have been more severe. In addition, the emails that were sent to UK recipients immediately before national radio and television news was telling people to delete all emails from unknown people that had attachments (because of an outbreak of serious virus attacks that were occurring)! It is possible that these factors affected the response rate and postal questionnaires might have achieved a higher return rate. However, the costs, time delays and extra effort involved still make postal questionnaires undesirable in a study that has a limited amount of time and resource available.

6 Important communication issues identified

The issues in this clause have emerged from examining the comments made in the interviews and the results obtained from the questionnaires. The amount of data obtained from the questionnaire responses did not lend itself to detailed statistical analysis. A content analysis of the data was performed and only where there appeared to be a clear indication of agreement or disagreement with the questions in the questionnaire has a topic been considered as giving a clear indication of a real issue. In clauses 6.1 to 6.7, quotes taken from interviews and questionnaires that help to reinforce the issues being discussed are shown in boxes.

It is recognized that a person's ability to communicate will be reduced if they lack appropriate support to help them compensate for any impairments that they may experience. It is therefore assumed throughout the current document that, where necessary, people will have access to appropriate assistive technologies such as large character displays, text readers or speech amplification.

6.1 Requirements focus

A very strong message arising from the study was that when trying to optimize communications, the focus should be on the requirements of the individual and not their age or their disability. Listing a specific disability or age might encourage someone to assume that the person would prefer a specific form of communication, where they might have a strong preference for a less obvious form of communication (e.g. a blind user might have a strong preference for email (with a text to speech converter), whereas many people might assume that their preference would be for speech-based communications).

6.2 Accessibility

This topic was fully explored during the in-depth interviews. However, there were no questions in the questionnaires that addressed accessibility as an isolated issue.

It has to be assumed that a person with disabilities will have their own assistive devices in order to communicate with others e.g. text readers, speech amplification. However, these may not be easily transportable and can only be used at home or work. Facilities need to be available to help people with disabilities when they are away from their normal environment e.g. in a hotel room, on holiday, etc.

"People with severe multiple disabilities can't take all of their assistive technology with them when they travel. They often will travel with a personal assistant."

"There should be a port on all main stream equipment which can be used to attach any assistive device."

Systems and services have to be accessible before they can be used. A design for all approach should be followed to overcome some of the problems of accessibility for the target groups of the elderly, the young and people with disabilities. For these groups, accessibility to communications systems and services is the priority, before any usability issues can be addressed.

6.3 Usability

A number of questions on the questionnaire were specifically aimed at finding more information in relation to the ease of use of communications.

6.3.1 Performing the sequence of steps required to make a call

This was not felt to be any more of a problem for our target groups than for the general population. Exceptions to this may be the very young, the very old, those with upper limb impairments and cognitively impaired people. However, any systems that aid in this would be of benefit to all, e.g. voice activated dialling, etc.

"Very young children can use the telephone. i.e. have a conversation, and know about turn taking. They are not necessarily making the call."

6.3.2 Lifting a handset and ending a call

This is a hardware, and will really only be a problem for some people with disabilities who do not have appropriate assistive devices. Enabling hands free communication could help here.

There are currently two main ways of ending a call:

1) to replace the receiver; and

2) to press an "end call" key.

Ending a call was not seen as a problem for any of the groups, although the very young may not realize the consequences of "hanging up" a call.

6.3.3 Accurately dialling telephone numbers

This was only an issue for very young children, cognitively impaired people, and those with some physical impairments.

Systems that provide the facility to select a number and it being automatically dialled would be of an aid here. For those who have slow response times, the time outs on a system can be a problem.

"It is hard to find the right keys on the telephone, especially when they are not probably marked (a dot on the 5-key as a minimum), and many get extra stressed by the fact that there is a time limit once you have started dialling a number".

6.3.4 Remembering telephone numbers

Being able to remember telephone numbers is a memory issue so may be more of a problem for cognitive impaired, the very old and very young children. Many systems currently have features available on the hardware such as short code dialling to help with this. However, there may be a downside to this type of help. When one is constantly using speed dialling one forgets the original number. And children may not develop this type of memory if they are not being required to remember numbers.

"This is a problem. Technology is undermining educational issues. Children do not need to remember phone numbers if it is stored in the phone. If they never need to remember long numbers they will never develop this capability".

"People with visual disabilities generally tend to be able to remember a lot of numbers. But with the lack of help from written notes etc. makes it very hard for some - primarily the elderly."

In addition there is the issue of different number formats being used on different networks. There is the problem of transfer of knowledge from one system to another.

6.3.5 Looking up telephone numbers in address books and directories

This skill requires a certain amount of literacy and therefore young children and cognitively impaired people will have problems. In addition blind people without the use of assistive devices may have problems.

"Blind people cannot use the address books in mobile phones".

"Some partially sighted people can use large written numbers in e.g. an address book, but in general this is not an option. Some computer users can use online directories with their assistive technology and some have special electronic devices - e.g. *(name of a commercial system)* that can also dial the number found".

This could be helped by presenting the information in different media, e.g. by using photographs or voice labels to the information.

As well as needing the ability to look up information in an address book, there is the issue of updating the information and whether this should be done manually or automatically. There is a current trend away from hard copy address books/directories to electronic address books/directories. The issues here with electronic address books/directories may not be the same as those for paper versions.

6.3.6 Needing reassurance

This only appeared to be an issue for very young children, who may not have performed some operations on a regular basis, and for some elderly people who can be fearful of new technology. In conclusion it is a person's confidence level which will determine whether they need reassurance or not.

The elderly also have a tendency to require human assistance and advice rather than machine help.

"This is primarily the elderly and it is not entirely due to their visual disability, but they can be very uncertain on a lot of things and be sure they are not able to e.g. dial a telephone number. For this group confirmation of which number they have dialled would be very good. But I would say that everybody should be able to check if he or she has done the right thing. This also goes for the visually impaired".

6.3.7 Participating in an effective conversation

From responses received it was obvious that respondents had assumed that reference was being made to traditional voice conversations, as it was seen as only a problem for deaf and hard of hearing people. Therefore offering communication in different media would solve many problems here.

6.3.8 Using interactive voice response (IVR) systems

Many services currently use automation that presents the caller with a spoken list of options to choose from, with an associated number needing to be pressed to make the selection. These types of dialogues are obviously a problem for deaf and hard of hearing people, and are a problem for many elderly people. This finding is consistent with a comparison between US residents [10] showed that the elderly respondents found IVR systems less satisfying than their younger counterparts and that they performed less well with them. Almost all of the elderly participants in another study [11] admitted that they always, or almost always, choose the option that connects them to a live operator, as did a quarter of the young participants.

"This is partly due to hearing and memory limitations (which vary a lot across the elderly population) but also to an overarching preference to speak to "a real person")".

"Accessing information services of all kinds can be a big problem for hard of hearing and cognitively impaired people. Audio announcements and operators who talk quickly (e.g. railway timetable details), and complex vocabularies make the problem worse".

The one thing which would help many people would be an automatic connection to human help if errors are being made. The option to select human help should also be easily provided. The length of the list of options can be an issue. One of the interviewees commented that "it is generally recommended that systems should not offer more than 3 choices at any one time" and [12] recommends "a maximum of four unrelated context dependent choices" in voice menus.

6.3.9 Usability conclusions

In conclusion there are many ease of use issues which are of particular importance to the target groups of the elderly, the young and people with disabilities. There needs to be simple options on offer in addition to more complex ones and the systems need to be intelligent to learn from behaviours. Features that can be automated to take the onus off the user are welcome. Simple functionality would also be useful for some groups; however, not all product marketing departments appear to accept this. The view that equipment has to provide all the new features and functions for it to be top in the marketplace appears to be a common marketing position.

6.4 Privacy and trust

In the initial interviews, some of the most frequently raised issues related to personal privacy and trust. The range of privacy issues raised included people's willingness to reveal personal data such as age, nature of their disability, etc. As a result of this, a number of questions in the questionnaire probed these issues in more depth.

Young children, people with cognitive impairments and many elderly people were seen as being particularly vulnerable because of varying degrees of naivety. This vulnerability results in many potential dangers. These could be real physical danger such as from paedophiles or criminals, nuisance from spam and sales calls or financial implications arising from invitations to use premium rate services. These areas were consistently cited in the interviews and in the questionnaire responses.

6.4.1 Exposing vulnerability

Interviewees representing all groups expressed concerns that members of their group were potentially vulnerable when communicating. For example, elderly and people with physical disabilities felt vulnerable to burglary from people that had discovered during a telephone call that they were alone.

> "Privacy is a big issue. Many elderly people do not want their age, or possibly frailty, broadcast as many feel that they could be sought out by sales people or worse still criminals."

However, results suggest that many elderly people are not concerned about revealing their age when communicating, indeed many are proud of their age and tend to broadcast it. Also many people with disabilities are happy to expose the nature of their disability if they see that by doing so it would make the communication easier.

> "Depends who the caller is and where they come from (i.e. organization) as well as whether he/she can provide some kind of convincing ID".

Our results supported the view that children tend to be unaware of the potential dangers of revealing their age. The tendency to reveal age information inappropriately is related to their prior exposure to safety advice.

> "Young children are naive, which can lead to problems about privacy".

In conclusion, exposing information on age or impairments under the right circumstances can lead to improved communications but in the wrong circumstances it may also lead to potentially threatening situations. People who use UCIs may have a lot of sensitive information stored on their behalf to assist them in managing their communications. The requirement is for assistance from the system to determine when it may be appropriate to disclose any of this sensitive information to others.

6.4.2 Allowing public access

Public access to information about a person is frequently available in public directories and other listings. When that information should be made available and what information should be contained were issues that were often mentioned during the study. The predominant message that arose when looking at elderly people and people with disabilities was that the decision on whether to have their details listed in a directory was a matter of personal choice and not influenced by their age and disability. The one significant exception to this was that people who were hard of hearing, deaf or deaf blind were more reluctant to be listed in directories. This appears to be associated with the difficulty in dealing with the unsolicited calls that might result from such a listing.

> "As long as 20 years ago I took our family phone number out of the telephone book (we are ex-directory) because I was unable to identify callers with ease, and often spoke for a few minutes during unsolicited calls from sales people before I realized who they were. The worst part of this was that these callers often ended up knowing that I was deaf - not very re-assuring from the aspect of personal security".

> "... such information could be of use commercially or by people who target vulnerable groups or by criminals" from a person representing deaf blind people.

With regard to children, many parents/guardians are afraid of public listings that reveal their children's age. This is due to the fear that revealing such information would expose them to unwanted communications from a variety of sources ranging from toy marketing campaigns to paedophiles. Education and publicity was seen as an important factor in whether or not parents were sufficiently aware.

Current control of public access to contact information is either fully public (e.g. listing in a directory) or fully private (e.g. unlisted). The requirement is to enable more flexible ways of allowing access to the names and contact details of people but that still protects those people's right to accept or reject unwanted communications.

6.4.3 Avoiding unwanted communications

The problem of how to control or filter incoming communications is one that affects everybody almost without exception. The proliferation of unsolicited sales calls on the telephone and "spam" on email can be a nuisance for most people but for some groups it can cause stress and even inhibit use of the communications medium.

"This all adds to many elderly people's fear of the telephone. Many are hesitant to answer because they fear a hard sell.

Respondents confirmed that this is a real problem for many of the groups. Many children and elderly people cannot differentiate between a genuine communication and sales pitch. On this particular issue they could be considered naïve. Blind people can find spam particularly irritating because it is awkward to scan an incoming message list with a text reader.

"Can be difficult to scan and dump emails with poor sight. Text to speech is laborious".

Spam filters are available for email but they suffer from many limitations. Because of the ease with which identities are falsified, spam filters cannot rely heavily on the claimed identity of the sender in filtering incoming mail. As a result, attempts to filter spam can lead to cases of wanted messages from known people being rejected and unwanted messages being accepted. Also, if their use is to closely match a user's needs, the spam filtering system will itself impose a management overhead of its own.

The only way currently to identify an incoming telephone call is by means of Calling Line Identification (CLI). This is of limited use in that it provides a **terminal** identifier which may or may not be known to the receiver of the communication. In addition, there are many circumstances in which legitimate and useful CLI information is not passed to the receiving terminal. Some of the target groups did use CLI to screen calls, in the absence of any alternative, and found it of some use. Sometimes, when available, a human "filter" can act as a sophisticated mechanism for identifying and filtering callers.

"My hearing partner usually answers and denies any knowledge of me if the caller is trying to sell something".

A special case of unwanted communications is emails with computer viruses and worms. Clearly anti-virus software has a role to play here but, in many cases, inspection of incoming message address fields is still essential to help to detect cleverly disguised attachments. Detection is clearly critical and provides real problems for some our groups who may find it difficult or impossible to study and analyse the address field information sufficiently rigorously. Even when rigorous inspection is possible, the ease with which identities can be "spoofed" and the prevalence of worms that send viruses from infected computers means that relying on inspecting incoming email address fields is insufficient as a means of total protection for any users.

"Viruses arriving with falsified identities are a real problem for all disabled people, but even more challenging for blind people who can't so easily scan the identity details".

Many of the difficulties and fears that members of the target groups experience relate to uncertainties about whether the apparent identity of the people trying to communicate with them can be trusted. If members of the groups had access to communication facilities where identity could be trusted, it would be much easier for them to be sure that they were communicating with people that they wanted to communicate with and that they were not being pestered or threatened by strangers.

6.4.4 Dealing with sensitive communications

Everybody, at times, needs to make communications which are sensitive in nature such as financial or romantic calls. Where an intermediary is involved in helping someone set-up or undertake communications, the privacy required for such a communication is compromised.

"I cannot call a woman to tell her that I love her (and other nice stuff) without a relay operator listening with red ears."

NOTE: Current relay services usually have strict privacy policies, but this is clearly not sufficient to remove the embarrassment experienced by this respondent.

Appropriate choice of communication media may eliminate the need for the human intermediary and hence reduce or eliminate the personal privacy problems.

6.5 Control of communications set-up

6.5.1 Initial set-up

Many young children live in a house where there is a PC, but they are quite likely not to be allowed to use it. It is the parent's machine and there is a perception that they might break it. Therefore any statistics on "access to computers at home" need to be viewed carefully.

"With kids it is generally not a problem of access to systems but a problem of misuse of the systems. Kids do not understand the implications of use, e.g. the cost, the implications of not passing on messages, not putting the receiver down."

One issue raised in many of the interviews was the importance of the system needing to be set-up to suit the needs of specific groups. Many may also need help in setting up the system. For people with disabilities, it is important that there is an option for them to be able to select the media for the input and output of the communication and the media with which help is presented.

"The more automated the set up is the better, for elderly and disabled. Configuration of systems usually adds complexity, the elderly in particular do not want more complexity".

"A disabled person needs to be able to select the media they want, and also the type of interface that they want. e.g. a basic/simple interface, vs. a complicated one".

Many communication systems are now becoming very complicated and as such need to be set-up before they can be used. In addition once set up, there is the possibility to use many additional features. This was seen as a real problem for elderly people and many people with disabilities (in particular blind and cognitive impaired people). The response for children was mixed with it being more of an issue for younger children.

"The elderly will follow instructions for set up of equipment, but they do not use manuals. There is also no transfer of knowledge from one piece of equipment to another. They have problems when things go wrong".

For any new service this can be a problem for all people. What are required are settings for novice and expert users so that once familiar with the system short cuts can be taken. In addition standardized settings across different services are needed.

Dialogues that are very complicated can be a problem for young children and cognitively impaired people who do not necessarily possess the literacy skills to be able to interact with the system. This is a situation which would require assistance from a third party.

"Could well be to do with the user manuals that are not always written in plain English and are often very involved, particularly as products today have more and more features. Not restricted just to older people!".

"Children have a more exploratory and intuitive way of using modern technology than adults - they have no inhibitions about "breaking things" if they do something wrong".

"There are two major problems here. One problem is that a lot of traditional communication terminals are very visually based and that you have to have sight to make set-ups and in some cases also to use. The other is that many visually impaired are elderly and not used to technical devices and very afraid and/or mystified by most new things. This is a hurdle when trying to teach them how to use a communication terminal. Therefore simpler is better."

6.5.2 Delegation of control

Most UCI users will have the benefit of being able to exercise full control of their personal communications set-up and use. However, in certain situations, such personal control may be inappropriate or unfeasible. Examples are young children and cognitively impaired adults with no literacy skills or those whose impairments severely restrict the range of tasks that they can perform, even with appropriate assistive technology.

As soon as another party becomes involved in managing a person's communication that party will have the ability to modify how and to whom the person can communicate. The more complex the management of communications becomes, the more dependant the person will be on being helped in the management tasks. However, the use of others in helping to set-up systems is already common in the field of the set-up of people's computer systems.

"Elderly people need support for complicated systems. They need help when things go wrong".

"How carers interact with those they care for is an issue of balancing support with control. This leads to concern about the ways in which children might adversely control their elderly parents" communications".

Some respondents have gone so far as to say that there always needs to be some mechanism to ensure that somebody whose communications are being managed by a parent/carer can communicate any abuse of that responsibility to an appropriate person.

Many of the issues related to the control of another person's communications can be seen as of basic human rights issues and may therefore be subject to relevant national human rights legislation.

6.5.3 Adapting to changing user requirements

In the case of elderly people or people whose disability becomes more severe over time, an issue will be at what point the involvement of another person in communication control becomes desirable or essential. Often the person may be unaware or unwilling to admit that they require assistance.

"Older people tend to have multiple minor disabilities and are less likely to perceive that they are disabled and ask for help (unlike a disabled child). Elderly people's disabilities are also progressive with time and they do not realize that there is a problem. Their requirements will also change over time".

In the case of children, parental control over communication is likely to be essential for very young children and the need for it will diminish as the children mature. However the simpler the system is to use, the more likely it is for the person to be able to manage their own communications. This simplicity could be inherent in the system or because simpler options have been set up by a third party.

"Parents have been known to clean up the vocabulary that a disabled child has stored on their assistive device as they see it as inappropriate, even if the disabled child thinks it is OK. The disabled are powerless to do anything about this type of behaviour".

6.6 Control of making a communication

6.6.1 Being aware of the financial implications of a communication

There was a significant concern expressed by respondents to the questionnaire and in the initial interviews concerning the targeting of children and other vulnerable groups with regard to premium rate calls. A topical example cited several times was a recent television program in which people (principally children and teenagers because of the subject matter) were invited to telephone and register a vote for their favourite pop idol. Another example was a telephone number sent by SMS which purported to put the person called in touch with an unclaimed prize (by ringing a premium rate number).

"Obviously there is a lot of interest in technology providers and advertisers luring children into areas/lists where they be exploited as consumers. This will not go away it will get worse".

The use of premium rate communications is a legitimate commercial practice which in most cases provides a service acceptable to its users. The results of the study suggest that a significant requirement of future systems is to ensure that those who may be financially naïve or in some other way unable to understand the way in which these communications are charged, are protected from excessive and unexpected costs.

6.6.2 Making urgent communications to a partner/carer/parent

Comments from many of the respondents suggested that current communications systems have limitations when members of their groups need to take urgent action or respond to an emergency situation.

Of all the issues raised in the questionnaires related to children and elderly people, the responses in the questionnaire suggest that maintaining the capability of communication with a partner/carer/parent is one of the most important.

"Basic communication is a lifeline for the elderly keeping in touch with family, doctors and hospitals".

There will inevitably be circumstances where an elderly, disabled or young person has urgent need to communicate with their carer or parent. Only email currently offers the facility of labelling a communication "urgent" but, not being a real-time service, its use in a truly "urgent" situation is limited. Text based telephony is far more likely to be used by those unable to use speech but can still be a slow process. In most cases a real-time voice based communication will be required.

Many facilities already exist to enable the speed-dialling of a small subset of commonly used identifiers ranging from dedicated buttons to single button transmitting devices which can be carried or worn at all times. Single button alarms work well where the called party is a monitoring service which is constantly manned. But in other circumstances where the person being called may not be at the particular terminal specified or is already using that terminal for another communication it could be difficult to establish a communication. In some countries call waiting identification is available as an additional service but it is only possible to receive such indications on special terminals and the service has technical limitations. If the carer or parent is physically away from the terminal specified then there is little that can be done except for the person trying to contact them to attempt alternative numbers.

It is clear that many of the target groups would greatly benefit from any mechanisms that improve the prospects of urgent communications getting through to carers/parents etc. They would need mechanisms that would not be defeated by such everyday events as the carer/parent etc. being away from home or engaged in another communication.

6.6.3 Providing a reminder and reassurance call facility

One of the topics raised frequently at the interviews was the need to keep a regular check on somebody's state or whereabouts. This could be so that the caller could find out their location (raised frequently for children and for elderly people suffering from dementia) or because of the need to issue regular reminders ("have you locked all the doors?")

Many useful services which could be provided by future communications services were proposed during the interviews:

- Keeping track of children. Knowing where they are or if they have strayed from an agreed location;
- Knowing if elderly parents were "wandering";
- Checking on an elderly parent on a regular basis i.e. ringing to see if they were OK several times per day;
- Reminding an elderly person to check that all the gas taps on a cooker were turned off every night.

"…it would be nice if the system could ring my mother and check that she had taken her pills (or maybe the system could remind me to ring her myself)".

To some extent these suggestions could be considered as outside the realm of a communication system and more relevant to an electronic personal organizer or specialized GPS based service. However future communication systems will "know" to a reasonable degree of accuracy, the location of the user (mobile phones as an example would pinpoint a user's location to a particular "cell"). They may also have a detailed "understanding" of the needs of their user and it would therefore be a simple step to build into the system rules which stimulated simple reminder and check calls when its user travelled to "unexpected" locations. These check calls could be to the user or to another nominated individual such as a parent or carer.

6.7 Contacting the emergency services

Comments from many of the respondents suggested that current communications systems have limitations when members of their groups need to take urgent action or respond to an emergency situation.

A call to the emergency services is likely to be time critical. In addition, the difference between a call to the emergency services and an urgent call described in clause 6.6.1 is that the recipient of the call (an emergency services operator) has little or no knowledge of the caller. This means that, after initial connection, the operator must engage in a question and answer procedure to elicit vital information such as the callers name, their location, nature of emergency etc. To minimize the total reaction time, both the dial time and the information elicitation need to be minimized.

The speed dialling capabilities of special terminals enable emergency numbers to be selected quickly and accurately. But other devices such as most mobile terminals do not usually have any form of emergency or "panic" button. Numbers must either be keyed or selected from the "phonebook".

There are special text based emergency services available for deaf people in some countries with an associated special emergency number (18000 in the UK). In the UK a call to this number is responded to even if no text input is forthcoming. Such terminals are not usually mobile and this could be very restrictive in many emergency situations (e.g. house fire, car accident).

"….if I contact emergency services I need to hear a well trained operator who speaks clearly and can understand what I am saying. I need to be able to drop back to text if there is a problem." (hard-of-hearing person).

Despite the special training of the operators, it can be difficult to elicit important information from anybody contacting the emergency service. The person may be in a state of distress or shock and be incoherent. If the person calling is a very young child, somebody with a cognitive disability or somebody who is hard of hearing then the problem of extracting important, critical information could increase significantly. An important requirement for future communications systems appears to be the automatic presentation of relevant details to an emergency operator and without the need for time consuming questions and answers. Information relating to the age or any disabilities of the caller could then be used to direct the call to a specialist operator when appropriate. In some circumstances the information presented, if it included home address or current GPS location, could be comprehensive enough to allow the automatic dispatch of an emergency service once the nature of the emergency had been ascertained.

7 Conclusion

The interviews and questionnaires provided a very wide number and range of communication issues that are important to the target groups (elderly people, the young and people with disabilities). Although the range of issues that emerged was wide, very many of the issues related to identity, privacy, trust and control of the set-up and making of communications. This is not accidental as the interviews and the questionnaires were deliberately structured to elicit views on these topics.

Given that identity, privacy, trust and control of the set-up and making of communications have already been identified as the primary strengths of UCI [3], [5] and [7], there would appear to be a lot of scope for UCI to assist the target groups in their communication tasks. The results of the study reported in the present document will form the basis for identifying specific ways in which UCI can be used to improve communications for the target groups. These solutions will be translated into guidelines that will be reported in a future ETSI Guide (EG).

Annex A:
Generic user requirements for communications systems

A.1 Notes relating to the user requirements

A.1.1 Origin of the user requirements

The requirements in this annex are those originally defined in EG 201 940 [3], with minor updates and clarifications. Guidelines in the present document support this set of user requirements.

A.1.2 Assumptions concerning the Universal Communications Identifier

Throughout this annex an assumption has been made that whenever a Universal Communications Identifier (UCI) is referred to, it will be as defined in EG 201 940 [3].

A.1.3 Dependencies and conflicts

It should be noted that some of these user requirements may wholly or in part conflict with other requirements; some support other requirements and some are dependent on other requirements.

A.2 The user requirements

This annex summarizes the generic user requirements of a modern, ideal communications system. For a more detailed analysis of these requirements and for a description of the system capabilities necessary to support such requirements see EG 201 472 [2].

A.2.1 Unifying the control of communications

Users, currently, can be faced with many options when wishing to setup, receive and manage their communications. Typically people may possess a fixed telephone, a mobile telephone, a PC with a home email address, another PC at work, an email address and a fax machine. Each terminal, application and service will have a different identifier, and method of setting up, receiving and managing communications. Each will also have different levels of control (e.g. a user can send an email labelled "urgent" but not make a telephone call similarly labelled) and different methods of storing communication history.

An effective and efficient multi-modal communications system would have a choice of terminals, a single universal identifier and a common method of setting up, receiving and managing communications.

User requirement No UR 1.1

Users require a unified method of, and support for, setting up, receiving and managing communications that is, as far as possible, independent of the terminal(s), application(s) and service(s) used. This would include provision of a single universal identifier covering all services and network types.

A.2.2 Seamless communication across networks and services

The independent development of different networks and services and their historical segregation has tended to make inter-network communication difficult if not impossible. Applications do exist to enable a user to send, for example, an email to a fax machine but typically it involves the user in significant effort. It is currently simpler for an originator to "experiment" until communication is established on one of the available networks than attempt to set up inter-network/inter-service communication.

User requirement No UR 1.2

Users require seamless communication across networks and services.

A.2.3 Increasing the options available to the originator

At the present time, an originator has little control over outgoing communications other than by choice of terminal. In future, the originator may want to specify the level of service required for a particular communication, specify what is to happen if the desired communication cannot be established or assign a priority. As the number of possible options increases, the complexity for the user may increase. The user will need to be allowed to choose their own balance between increasing the options that they control and reducing the complexity that a large number of choices can create.

User requirement No UR 1.3

The originator of a communication requires the ability to indicate to the system particular requirements relating to the outgoing communication.

A.2.4 Increasing the options available to the recipient

With the increasing number of communication options available to users it is becoming important to manage incoming communications effectively. In particular, a user may wish to divert incoming communications from one terminal to another depending on their own geographical location or the time/date. The recipient may also wish for the re-routing of communications to depend on the urgency of the call, who it is from or some other attribute. Geographically determined re-routing of communications could be automated to varying degrees using GSM, GPS, AI techniques, polling, or other forms of presence detection.

User requirement No UR 1.4

The recipient requires the ability to control incoming communications.

A.2.5 Dealing with communications conflicts between originator and recipient

If the originator has specified particular attributes or conditions for a communication and the recipient has specified communication management criteria which conflict with those, then the system entities which represent originator and recipient within the network(s) should negotiate a mutually acceptable solution.

User requirement No UR 1.5

Users require that conflicts between the communication requirements of the originator and the recipient should be resolved, where possible, without their intervention.

A.2.6 Maintaining backward compatibility

Future architectures will provide users with increased control over the sending and receiving of communications. Taking full advantage of this increased functionality will almost certainly require sophisticated user interfaces. However, for the foreseeable future, a large number of terminals (principally telephones) will have limited or no ability to input alpha characters. It is important that these users are still able to use communications systems based on the new architectures, albeit with decreased functionality.

User requirement No UR 1.6 - Maintaining backward compatibility

Users may wish to use basic input devices such as a 12-button numeric keypad to obtain a basic level of service, even when using future architectures.

A.2.7 Trust in the system

Trust in a communications system is clearly dependent on many issues other than technical ones. A user's trust in a communications system will be influenced not only by the security mechanisms within the system but by political and psychological factors as well.

However, trust can be maximized by providing "appropriate" levels of security. A typical user may not be concerned about the integrity of 95 % of their communications and supplying checks and verifications on these would be inefficient with respect to system performance and frustrating for the user. But for the remaining 5 % the user may require these features and needs to have confidence that in these cases appropriate security is in place.

User requirement No UR 1.8 - Trust in the system

To have trust in a communications system, users require an appropriate level of security to be provided and when necessary an assurance of the integrity of the communication and the identity of the person they are communicating with.

A.2.8 Appropriate level of privacy

Privacy is defined as the ability of the user to choose who knows their UCI and under what circumstances and from whom they can accept incoming communications. Users will wish to have the freedom to determine who is able to gain access to their UCI (via such mechanisms as UCI searches). They will also wish to have full control over who is able to communicate with them, when and by what means.

User requirement No UR1.9 - Appropriate level of privacy

Users will require different levels of privacy dependant on their individual needs.

Annex B: Organizations consulted

A very large range of organizations were consulted in the course of this work. The following organizations were either directly contacted or were identified as having been contacted during a secondary distribution of the questionnaires. Many other organizations were contacted as part of secondary distributions by individuals and by organizations such as the EDF. In addition to the organizations consulted, several individuals who either fitted the relevant category or who were acknowledged experts about one of the categories were contacted. To preserve personal privacy, no individual names have been listed.

The organizations have been placed under three headings according to the primary function of the organization (as understood by those doing the distribution). However, many of these organizations represent more than one group and several organizations returned multiple questionnaires.

B.1 Organizations associated with young children

British Education Communication & Technology Agency, Brighton University (School of Computing), British Broadcasting Corporation, Cambridge University (Faculty of Education), Coventry University (VIDe Research Centre), Dundee University (Department of Applied Computing), Technical University of Eindhoven (Department of Technology Management), Ericsson, European Commission, Köln University (Department of Education), Learning and Teaching Scotland, Lego Europe, Microsoft, Massachusetts Institute of Technology, Nottingham University (Department of Psychology), Philips research (Media Interaction Group), Sterling University (Institute of Education), Telenor, University College London, University of Vienna (Institut for Publizistik und Kommunikationswissenschaft), University of Northumbria.

B.2 Organizations associated with elderly people

Age and Cognitive Performance Research Centre, Age Concern, Age Concern Institute of Gerontology, BT, Dundee University, Empirica, European Commission, Ricability, Stakes, Work Research Centre.

B.3 Organizations associated with people with disabilities

British Centre for Deaf Studies, BT, Communication Matters, Danish Association of the Blind, Danish Centre for Technical Aids for Rehabilitation and Education, Connect Ireland, DeafAdults (Reading University), Deafblind UK, Delta Centre, European Blind Union, European Design for All e-Accessibility Network (EDeAN), European Disability Forum, Hearing Concern, INRIA, Institute for Rehabilitation Research, Intellect, Isdac, Members of the Oftel/DIEL committee, Members of the PhoneAbility committee, Mencap, National Disability Authority Ireland, RNIB, RNID, Telenor.

Annex C: Questionnaires

The three questionnaires that were used are shown in this annex. In order that the raw numerical results obtained from the questionnaires can be seen, the total number of responses for each category of every question is shown inside the relevant category box. For the questionnaire related to disability, the response boxes for each question are reproduced several times to accommodate the answers for each disability category. The actual questionnaires only had a single line of response boxes per question.

UCI Questionnaire: People with disabilities

Please send completed questionnaire by 8th September to:

mellors_wmserv@compuserve.com

This is a short questionnaire sent on behalf of a Specialist Task Force (STF) of the European Telecommunications Standards Institute (ETSI) which is investigating the use of a Universal Communications Identifier (UCI). We believe the UCI may help to improve communications services such as the telephone, email, etc. for elderly, disabled and very young people. A leaflet that gives a simple explanation of UCI can be found at:

http://www.eeurope-standards.org/brochures.htm (alternatively, we can send you an electronic version attached to an email or post you a leaflet).

In the first part of our work we approached a carefully selected group of people who have a detailed knowledge of the issues that elderly, disabled and very young people experience in their communications. During the course of interviews with these experts we noted a number of statements that were frequently made. In this next part of our work we want to approach a wider group of people to determine the degree of agreement with these statements.

We would like you to answer the following questions by placing an "X" in the appropriate box, based on your own experiences of working with people with disabilities. As the range of potential disabilities is very large and the effect of these disabilities upon a person's communications can vary widely, it is very important to distinguish what disability or disabilities you are referring to in answering the following questions. Question 1 asks for this information. If your experience is with a broad range of disabilities please feel free to copy this questionnaire and provide different sets of answers for the different types of disability.

Where the questions use the term "communication" it covers any form of electronic communications including the telephone, email, text messaging, etc. If you wish to say more about any of the topics then please feel free to use the "Comments" box.

When we have looked at the replies you and the other people we are contacting provide, we will be certain of the real communication issues that we need to address.

1) Please list the disability type(s) to which your answers apply:

2) "People with disabilities are happy to expose the nature of their disability to a caller if they feel that it will make their communication easier."

This statement applies to:

	most	many	some	few	hardly any
All	1		2		
Blind, etc.		2	2		1
Learn/Cog	1	2	1		
Deaf/HoH	1	3	3	1	
Physical		3			
Sensory disab.			1		

people with disabilities
1 no answer

Comment (optional):

3) "People with disabilities choose to avoid having their names listed in public directories ("going ex-directory") to avoid receiving any communications that they may not want or like".

This statement applies to:

	most	many	some	few	hardly any
All			3		
Blind, etc.		1	1	1	2
Learn/Cog		1	2	1	
Deaf/HoH		6	2		
Physical	2			1	
Sensory disab.				1	

people with disabilities
1 no answer

Comment (optional):

4) "People with disabilities are afraid of having a listing in a public directory that indicates that they may have a disability (e.g. a listing that shows that they have a text phone).

This statement applies to:

	most	many	some	few	hardly any
All	2		1		
Blind, etc.	4	1			
Learn/Cog	1		1		1
Deaf/HoH	2	3	2		1
Physical	1	1		1	
Sensory disab.			1		

people with disabilities

1 no answer

Comment (optional):

5) "People with disabilities are aware of the potential dangers of revealing information about themselves to strangers".

This statement applies to:

	most	many	some	few	hardly any	people with disabilities
All	1	2				1 no answer
Blind, etc.	1	2	2			
Learn/Cog		2	1	1		
Deaf/HoH	1	5	1	1		
Physical	1	1		1		
Sensory disab.			1			

Comment (optional):

6) "People with disabilities fear being contacted by strangers as they believe that they may reveal their vulnerability and make themselves vulnerable to exploitation by these strangers".

This statement applies to:

	most	many	some	few	hardly any	people with disabilities
All			3			1 no answer
Blind, etc.	1	1	2			
Learn/Cog		2	2			
Deaf/HoH		3	5			
Physical		1	2			
Sensory disab.			1			

Comment (optional):

7) People with disabilities can be tricked into making communications. e.g. phoning a premium rate line to enter a competition. They don't understand the implications".

This statement applies to:

	most	many	some	few	hardly any	people with disabilities
All			3			1 no answer
Blind, etc.	1		4			
Learn/Cog	1	2	1			
Deaf/HoH		1	2	2	1	2 no answer
Physical			1		1	1 no answer
Sensory disab.					1	

Comment (optional):

8) In our initial studies we received many statements similar to: "People with disabilities require assistance in making a communication".

In examining this statement in more detail we would like you to rate the following statements relating to people with disabilities' difficulties in making a phone call.

People with disabilities have difficulty making a phone call because they are:

a) Find it difficult to perform the sequence of steps required to make the call

This applies to:

	most	many	some	few	hardly any	people with disabilities
All			3	1		1 no answer
Blind, etc.		1		1	3	
Learn/Cog	1		3			
Deaf/HoH		2	1	1	4	
Physical		1	2			
Sensory disab.					1	

Comment (optional):

b) Find it difficult to remember phone numbers

This applies to:

	most	many	some	few	hardly any	people with disabilities
All			4			
Blind, etc.		2	1		2	
Learn/Cog	1	2	1			
Deaf/HoH				2	5	1 no answer
Physical					3	
Sensory disab.					1	

Comment (optional):

c) Find it difficult to look up phone numbers in an address book or directory

This applies to:

	most	many	some	few	hardly any	people with disabilities
All		1	3			
Blind, etc.	3	1	1			
Learn/Cog		3	1			
Deaf/HoH		1			7	
Physical		1	1	1		
Sensory disab.		1				

Comment (optional):

d) Find it difficult to lift a handset

This applies to:

	most	many	some	few	hardly any	people with disabilities
All		1	3			
Blind, etc.				1	4	
Learn/Cog			2	2		
Deaf/HoH				1	6	
Physical		2	1			1 no answer
Sensory disab.					1	

Comment (optional):

e) Find it difficult to accurately dial a phone number

This applies to:

	most	many	some	few	hardly any	people with disabilities
All			2	2		
Blind, etc.		1	1	1	2	
Learn/Cog		1	3			
Deaf/HoH				2	5	1 no answer
Physical	1	1	1			
Sensory disab.			1			

Comment (optional):

f) Find it difficult to participate in an effective conversation (for whatever reason).

This applies to:

	most	many	some	few	hardly any	people with disabilities
All			2	2		
Blind, etc.				1	4	
Learn/Cog		1	2	1		
Deaf/HoH	1	4	2		1	
Physical			1		2	
Sensory disab.			1			

Comment (optional):

g) Unsure how to end a call.

This applies to:

	most	many	some	few	hardly any	people with disabilities
All			1	1	2	
Blind, etc.			1		4	
Learn/Cog			2	2		
Deaf/HoH			1	2	4	1 no answer
Physical					3	
Sensory disab.			1			

Comment (optional):

h) Need re-assurance that they are doing the right things.

This applies to:

	most	many	some	few	hardly any	people with disabilities
All			1	3		
Blind, etc.			1		4	
Learn/Cog			2	2		
Deaf/HoH			1	2	4	1 no answer
Physical					3	
Sensory disab.			1			

Comment (optional):

9) "People with disabilities have difficulty setting-up and using features on their communication terminals. applications and services (e.g. phone, email program, voicemail, etc.)".

This statement applies to:

	most	many	some	few	hardly any	people with disabilities
All		1	2	1		
Blind, etc.	1	4				
Learn/Cog		4				
Deaf/HoH		2	3	2	1	
Physical	1	1	1			
Sensory disab.			1			

Comment (optional):

10) "People with disabilities have problems with automated services that present the caller with a spoken list of options to choose from and that require a number to be pressed to make the choice".

This statement applies to:

	most	many	some	few	hardly any	people with disabilities
All		3	1			
Blind, etc.		2		1	1	
Learn/Cog	2	2				
Deaf/HoH	5	1	1		1	
Physical	1		2			
Sensory disab.				1		

Comment (optional):

11) "People with disabilities cannot differentiate unsolicited communication from real communication. (NB spam or marketing)".

This statement applies to:

	most	many	some	few	hardly any	people with disabilities
All			3	1		
Blind, etc.	1		3	1		
Learn/Cog	2	2				
Deaf/HoH				1	7	
Physical					3	
Sensory disab.					1	

Comment (optional):

12) "People with disabilities find it difficult to say which communications they are happy to receive and which ones they would like to avoid".

This statement applies to:

	most	many	some	few	hardly any	people with disabilities
All			2	2		
Blind, etc.	1	1	1	2		
Learn/Cog		2		2		
Deaf/HoH			1	2	5	
Physical					3	
Sensory disab.			1			

Comment (optional):

13) "Partners/companions/care workers are actively involved in the setting-up or receiving of communications for people with disabilities".

This statement applies to:

	most	many	some	few	hardly any	people with disabilities
All		1	3			
Blind, etc.	1	4				
Learn/Cog	1	3				
Deaf/HoH	1	3		2	2	
Physical			3			
Sensory disab.			1			

Comment (optional):

14) "Involvement of partners/companions/care workers in the setting-up or receiving of communications for people with disabilities creates control or privacy issues for the person with disabilities".

This statement applies to:

	most	many	some	few	hardly any	people with disabilities
All		1	2	1		
Blind, etc.	1	1	3			
Learn/Cog	1	2	1			
Deaf/HoH	2	4			2	
Physical	1	1	1			
Sensory disab.			1			

Please give examples if possible:

15) "People with disabilities need to be able to easily communicate with their partner/companion/care worker."

This statement applies to:

	most	many	some	few	hardly any	people with disabilities
All	2	2				
Blind, etc.	5					
Learn/Cog	3					1 no answer
Deaf/HoH	7	1				
Physical	1	1		1		
Sensory disab.			1			

Comment (optional):

16) "Partners/companions/care workers need to be able to easily communicate with the person with disabilities".

This statement applies to:

	most	many	some	few	hardly any	people with disabilities
All	2	2				
Blind, etc.	5					
Learn/Cog	3					1 no answer
Deaf/HoH	7	1				
Physical	2			1		
Sensory disab.			1			

Comment (optional):

Other issues relating to the practical problems of communication that you would like to raise:

I would like to be kept informed of the findings of this study ☐

e-mail address to which the findings should be sent:

UCI Questionnaire: Young children

Please send completed questionnaire by 8th September to:

mellors_wmserv@compuserve.com

This is a short questionnaire sent on behalf of a Specialist Task Force (STF) of the European Telecommunications Standards Institute (ETSI) which is investigating the use of a Universal Communications Identifier (UCI). We believe the UCI may help to improve communications services such as the telephone, email, etc. for elderly, disabled and very young people. A leaflet that gives a simple explanation of UCI can be found at:

http://www.eeurope-standards.org/brochures.htm (alternatively, we can send you an electronic version attached to an email or post you a leaflet).

In the first part of our work we approached a carefully selected group of people who have a detailed knowledge of the issues that elderly, disabled and very young people experience in their communications. During the course of interviews with these experts we noted a number of statements that were frequently made. In this next part of our work we want to approach a wider group of people to determine the degree of agreement with these statements.

We would like you to answer the following questions by placing an "X" in the appropriate box, based on your own experiences of working with young children (age up to 12 years). Where the questions use the term "communication" it covers any form of electronic communications including the telephone, email, text messaging, etc. If you wish to say more about any of the topics then please feel free to use the "Comments" box.

When we have looked at the replies you and the other people we are contacting provide, we will be certain of the real communication issues that we need to address.

1) "Young children are happy to expose their age to someone with whom they are communicating".

This statement applies to:

most	many	some	few	hardly any	young children
1	5	4			1 no answer

Comment (optional):

2) "Parents/guardians are afraid of public listings that indicate their child's age (e.g. in a list of email or chat identities)".

This statement applies to:

most	many	some	few	hardly any	parents/guardians
4	3	1	2		1 no answer

Comment (optional):

3) "Parents/guardians do not allow their children's names to be publicly listed to avoid them receiving communications that they may not want or like".

This statement applies to:

most	many	some	few	hardly any	parents/guardians
5	4		1		1 no answer

Comment (optional):

4) "Young children are aware of the potential dangers of revealing information about themselves to strangers".

This statement applies to:

most	many	some	few	hardly any	young children
1		6	2	2	

Comment (optional):

5) "Young children fear being contacted by any strangers as they believe that they may reveal their vulnerability and make themselves vulnerable to exploitation by these strangers".

This statement applies to:

most	many	some	few	hardly any	young children
	2	3	1	3	2 no answer

Comment (optional):

6) "Young children can be tricked into making communications e.g. voting for pop idols. They don't understand the implications".

This statement applies to:

most	many	some	few	hardly any	young children
5	5	1			

Comment (optional):

7) "Security measures need to be in place to prevent bad people e.g. paedophiles getting in touch with young children".

This statement applies to:

most	many	some	few	hardly any	young children 1 no answer
9	1				

Comment (optional):

8) In our initial studies we received many statements similar to: "Young children require assistance in making a communication".

In examining this statement in more detail we would like you to rate the following statements relating to young children's difficulties in making a phone call.

Young children have difficulty making a phone call because they:

a) Find it difficult to perform the sequence of steps required to make the call.

This applies to:

most	many	some	few	hardly any	young children 1 no answer
	1	3	4	2	

Comment (optional):

b) Find it difficult to remember phone numbers.

This applies to:

most	many	some	few	hardly any	young children
	5,5	4,5			

Comment (optional):

c) Find it difficult to look up phone numbers in an address book or directory.

This applies to:

most	many	some	few	hardly any	young children
	5,5	1,5	2		

Comment (optional):

d) Find it difficult to lift a handset.

This applies to:

most	many	some	few	hardly any	young children 2 no answer
		1	2	6	

Comment (optional):

e) Find it difficult to accurately dial a phone number.

This applies to:

most	many	some	few	hardly any	young children 1 no answer
0,3		3,3	3,3	3	

Comment (optional):

f) Find it difficult to participate in an effective conversation (for whatever reason).

This applies to:

most	many	some	few	hardly any	young children 1 no answer
		4,3	4,3	1	

Comment (optional):

g) Unsure how to end a call.

This applies to:

most	many	some	few	hardly any	young children 1 no answer
	2	2	3	3	

Comment (optional):

h) Need re-assurance that they are doing the right things.

This applies to:

most	many	some	few	hardly any	young children 1 no answer
0,3	2	3,3	3,3	1	

Comment (optional):

9) "Young children have difficulty setting up and using features on their communication terminals, applications and services (e.g. phones, email programs, voicemail, etc.)."

This statement applies to:

most	many	some	few	hardly any	young children
3	1	3	3		1 no answer

Comment (optional):

10) "Young children have problems with automated services that present the caller with a list of options to choose from and that require a number to be pressed to make the choice".

This statement applies to:

most	many	some	few	hardly any	young children
	4	2	3		2 no answer

Comment (optional):

11) "Young children do not have the literacy skills to be able to follow written instructions".

This statement applies to:

most	many	some	few	hardly any	young children
2	2	4		1	2 no answer

Comment (optional):

12) "Young children do not have the literacy skills to be able to communicate using SMS/email".

This statement applies to:

most	many	some	few	hardly any	young children
	2	3	4		2 no answer

Comment (optional):

13) "Young children cannot differentiate unsolicited communication from real communication. (NB spam or marketing)".

This statement applies to:

most	many	some	few	hardly any	young children
3	5	1	2		

Comment (optional):

14) "Young children find it difficult to say which communications they are happy to receive and which ones they would like to avoid".

This statement applies to:

most	many	some	few	hardly any	young children 1 no answer
1	3	4	2		

Comment (optional):

15) "It should be possible to restrict a young child's communications so that they can only contact and be reached by a specified group of people (e.g. school friends and family)".

This statement applies to:

most	many	some	few	hardly any	young children 1 no answer
5	2	2		1	

Comment (optional):

16) "Parents/guardians are actively involved in the setting-up or receiving of communications for young children".

This statement applies to:

most	many	some	few	hardly any	young children
1	4	5	1		

Comment (optional):

17) "Involvement of parents/guardians in the setting-up or receiving of communications for young children creates control or privacy issues for the young child".

This statement applies to:

most	many	some	few	hardly any	young children 1 no answer
1	4	5			

Please give examples if possible:

18) "Young children need to be able to easily communicate with parents/guardians."

This statement applies to:

most	many	some	few	hardly any	young children
8	2	1			

Comment (optional):

19) "Parents/guardians need to be able to easily communicate with their young children".

This statement applies to:

most	many	some	few	hardly any	young children
7	3		1		

Comment (optional):

Other issues relating to the practical problems of communication that you would like to raise:

I would like to be kept informed of the findings of this study ☐

e-mail address to which the findings should be sent:

UCI Questionnaire: Elderly people

Please send completed questionnaire by 8th September to:

mellors_wmserv@compuserve.com

This is a short questionnaire sent on behalf of a Specialist Task Force (STF) of the European Telecommunications Standards Institute (ETSI) which is investigating the use of a Universal Communications Identifier (UCI). We believe the UCI may help to improve communications services such as the telephone, email, etc. for elderly, disabled and very young people. A leaflet that gives a simple explanation of UCI can be found at:

http://www.eeurope-standards.org/brochures.htm (alternatively, we can send you an electronic version attached to an email or post you a leaflet).

In the first part of our work we approached a carefully selected group of people who have a detailed knowledge of the issues that elderly, disabled and very young people experience in their communications. During the course of interviews with these experts we noted a number of statements that were frequently made. In this next part of our work we want to approach a wider group of people to determine the degree of agreement with these statements.

We would like you to answer the following questions by placing an "X" in the appropriate box, based on your own experiences of working with elderly people. Where the questions use the term "communication" it covers any form of electronic communications including the telephone, email, text messaging, etc. If you wish to say more about any of the topics then please feel free to use the "Comments" box.

When we have looked at the replies you and the other people we are contacting provide, we will be certain of the real communication issues that we need to address.

1) "Elderly people are happy to give out their date of birth".

This statement applies to:

most	many	some	few	hardly any	elderly people
	2	5			

Comment (optional):

2) "Elderly people choose to avoid having their names listed in public directories ("going ex-directory") to avoid receiving any communications that they may not want or like".

This statement applies to:

most	many	some	few	hardly any	elderly people 1 no answer
	3	1	1	1	

Comment (optional):

3) "Elderly people are aware of the potential dangers of revealing information about themselves to strangers".

This statement applies to:

most	many	some	few	hardly any	elderly people
	2	4	1		

Comment (optional):

4) "Elderly people fear being contacted by strangers as they believe that they may reveal their vulnerability and make themselves vulnerable to exploitation by these strangers".

This statement applies to:

most	many	some	few	hardly any	elderly people
1	2	4			

Comment (optional):

5) "Elderly people can be tricked into making communications. e.g. phoning a premium rate line to enter a competition. They don't understand the implications".

This statement applies to:

most	many	some	few	hardly any	elderly people
2		5			

Comment (optional):

6) In our initial studies we received many statements similar to: "Elderly people require assistance in making a communication".

In examining this statement in more detail we would like you to rate the following statements relating to elderly people's difficulties in making a phone call.

"Elderly people have difficulty making a phone call because they are:

a) Find it difficult to perform the sequence of steps required to make the call.

This applies to:

most	many	some	few	hardly any	elderly people
		4	3		

Comment (optional):

b) Find it difficult to remember phone numbers.

This applies to:

most	many	some	few	hardly any	elderly people
	3	3	1		

Comment (optional):

c) Find it difficult to look up phone numbers in an address book or directory.

This applies to:

most	many	some	few	hardly any	elderly people
	1	6			

Comment (optional):

d) Find it difficult to lift a handset.

This applies to:

most	many	some	few	hardly any	elderly people
		2	4	1	

Comment (optional):

e) Find it difficult to accurately dial a phone number.

This applies to:

most	many	some	few	hardly any	elderly people
		6	1		

Comment (optional):

f) Find it difficult to participate in an effective conversation (for whatever reason)

This applies to:

most	many	some	few	hardly any	elderly people
		3	3	1	

Comment (optional):

g) Unsure how to end a call.

This applies to:

most	many	some	few	hardly any	elderly people
		2	3	2	

Comment (optional):

h) Need re-assurance that they are doing the right things.

This applies to:

most	many	some	few	hardly any	elderly people
1	2	2	2		

Comment (optional):

7) "Elderly people have difficulty setting-up and using features on their communication terminals. applications and services (e.g. phone, email program, voicemail, etc.)".

This statement applies to:

most	many	some	few	hardly any	elderly people
1	4	2			

Comment (optional):

8) "Elderly people have problems with automated services that present the caller with a spoken list of options to choose from and that require a number to be pressed to make the choice."

This statement applies to:

most	many	some	few	hardly any	elderly people
2	4	1			

Comment (optional):

9) "Elderly people cannot differentiate unsolicited communication from real communication. (NB spam or marketing)".

This statement applies to:

most	many	some	few	hardly any	elderly people
	3	4			

Comment (optional):

10) "Elderly people find it difficult to say which communications they are happy to receive and which ones they would like to avoid".

This statement applies to:

most	many	some	few	hardly any	elderly people
	2	5			

Comment (optional):

11) "Partners/companions/care workers are actively involved in the setting-up or receiving of communications for elderly people".

This statement applies to:

most	many	some	few	hardly any	elderly people
	1	4	2		

Comment (optional):

12) "Involvement of partners/companions/care workers in the setting-up or receiving of communications for elderly people creates control or privacy issues for the elderly person".

This statement applies to:

most	many	some	few	hardly any	elderly people
	2	5			

Please give examples if possible:

13) "Elderly people need to be able to easily communicate with their partner/companion/care worker."

This statement applies to:

most	many	some	few	hardly any	elderly people
6	1				

Comment (optional):

14) "Partners/companions/care workers need to be able to easily communicate with the elderly person".

This statement applies to:

most	many	some	few	hardly any	elderly people
6	1				

Comment (optional):

Other issues relating to the practical problems of communication that you would like to raise:

I would like to be kept informed of the findings of this study ☐

e-mail address to which the findings should be sent:

History

Document history		
V1.1.1	November 2003	Publication