

IS4ALL: An EC-funded initiative to promote design for all in Healthcare

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Abstract

This paper presents in brief IS4ALL; an European Commission (EC)-funded project promoting and facilitating universal access in Health Telematics. IS4ALL is the successor of several efforts in the area of HCI aiming to advance the notion and practice of universal design in human computer interaction. Also, it constitutes an extension of the series of meetings and workshops held by the International Scientific Forum “Towards an Information Society for all”. In this paper, we outline the technical objectives and methodological approach of IS4ALL in an attempt to describe how the projects sets out to achieve its target.

1. Introduction

The International Scientific Forum “Towards an Information Society for All’ was launched in 1997, as an international ad hoc group of experts sharing common visions and objectives, namely the advancement of the principles of Universal Access in the emerging Information Society. The Forum held three workshops to establish an interdisciplinary discussion form, a common vocabulary to facilitate exchange and dissemination of knowledge, and to promote international co-operation. The 1st workshop took place in San Francisco, USA, August 29, 1997, and was sponsored by IBM. The 2nd took place in Crete, Greece, June 15-16, 1998. The 3rd took place in Munich, Germany, August 22-23, 1999. The latter two events were partially funded by the European Commission. The Forum has produced two White Papers (Stephanidis et al., 1998 and Stephanidis et al., 1999). They report on an evolving international R&D agenda focusing on the development of an Information Society acceptable to all citizens, based on the principle of *designing for all*¹. The proposed agenda addresses technological and user-oriented issues, application domains, and support measures. The Forum has also elaborated on the proposed agenda by identifying challenges in the field of human-computer interaction, and clusters of concrete recommendations for international collaborative R&D activities. Moreover, the Forum has addressed the concept of *accessibility* beyond the traditional fields of inquiry (e.g., assistive technologies, housing, etc), in the context of selected mainstream Information Society Technologies, and important application domains with significant impact on society as a whole (e.g., Healthcare).

Based on the success of its initial activities, the Forum has proposed IS4ALL (Information Society for All) – a new EC-funded project aiming to advance the principles and practice of Universal Access towards the wider IST community. In particular, the project focuses on the area of Healthcare Telematics, a critical Information Society application domain, and on emerging technologies shaping the nature and contents of this domain. IS4ALL is therefore seeking to establish on a more formal basis a wider, interdisciplinary and closely collaborating “network of experts” (Working Group) to provide the European Healthcare industry with a comprehensive information package detailing how to appropriate the benefits of universal design.

2. Concepts, principles and objectives

Universal Design (Story, 1998) postulates the design of products or services that are accessible, usable and, therefore, acceptable by potentially everyone, everywhere and at any time. While it is favourably received and well-established in engineering disciplines such as architecture, interior and landscape design, it remains a loosely understood notion when it comes to Information Society Technologies. In the past, the vast majority of the work

¹ The terms “Universal Design” and “Design for All” are used interchangeably in this document.

dedicated to promoting Universal Access to the Information Society has been carried out through isolated activities and project work (Stephanidis and Emiliani, 1999). Although the results of these efforts are slowly finding their way into industrial practices (e.g., certain mobile telephones, point-of-sale terminals, public kiosks, user interface development toolkits), a common platform for researchers and practitioners in Europe to collaborate and arrive at applicable solutions is missing. Furthermore, these examples have not sufficed to create the necessary critical mass to widely promote the principles of Universal Access. As a consequence, collaborative efforts are needed to collect, consolidate and validate the distributed wisdom at the European as well as the international level, and apply it in an application area of critical importance (i.e., Healthcare Telematics).

IS4ALL sets out to accomplish the above innovative goals and advance the practice of universal design in Healthcare Telematics. The primary focus of the proposed activities of IS4ALL is on the impact of advanced desktop and mobile interaction technologies on emerging Healthcare products and services. The choice of the Healthcare domain can be justified on the grounds of it being a critical service sector, catering for the population at large, and at the same time involving a variety of diverse target user groups (e.g., doctors, nurses, administrators, patients). These characteristics render a complex domain of discourse, due to inherent diversity, and an ideal "testbed" for exemplifying the principles of Universal Access and assessing both the challenges and the opportunities in the context of an emerging Information Society. On the other hand, by emerging interaction platforms we mean primarily advanced desktop-oriented environments (e.g., advanced GUIs, 3D graphical toolkits, visualisers), and mobile platforms (e.g., palmtop devices) enabling ubiquitous access to electronic data from anywhere, and at anytime. Such technologies are expected to bring about radical improvements in the type and range of Healthcare services. Accounting for the accessibility, usability and acceptability of these technologies at an early stage of their development is likely to improve their market impact as well as the actual usefulness of the end products.

The specific technological / scientific objectives to be attained by IS4ALL can be summarised as follows:

- Consolidate existing knowledge on Universal Access in the context of Information Society Technologies, which is currently dispersed across different international sites and actors, into a comprehensive code of design practice (e.g., enumeration of methods, process guidelines, etc).
- Translate the consolidated wisdom to concrete recommendations for emerging technologies (e.g., emerging desktop and mobile platforms) in a critical application domain, which is Healthcare Telematics.
- Demonstrate the validity and applicability of the recommendations in the context of concrete scenarios drawn from an experimental regional Healthcare Telematics network.
- Promote the Universal Access principles and practice in Healthcare Telematics through a mix of outreach activities, including 6 seminars and participation in several international conferences.

By the end of the project, IS4ALL will have accomplished several operational goals:

First of all, IS4ALL will have developed a code of practice which will provide European industries with state of the art reference material and support services on how to approach, internalise and exploit the benefits of universal design in the development of Healthcare Telematics products and services.

Secondly, IS4ALL will have organised six seminars, targeted to mainstream IT&T industry, to be held in different European countries. These seminars will help IS4ALL to reach a wide community of potential participants and make them aware of the principles and practice of Universal Access in Healthcare Telematics. Additionally, IS4ALL will have participated in several international conferences to promote the project's results. Some of these conferences are already known in advance, while others will be decided upon during the project's lifetime in close collaboration with the European Commission. It should be noted that participation in these conferences might take various forms, including submitting and presenting papers, but also organising workshops, tutorials and special panel sessions.

Finally, IS4ALL will target relevant international standardising organisations to facilitate updates in draft international standards or the introduction of new work items, which accommodate the project's results. This activity will be realised by preparing and submitting technical reports and subsequently presenting them during the scheduled meetings of the respective bodies. Of primary importance will be standardisation at an international (i.e. ISO) level and in particular the new Work Item on Accessibility under ISO9241/SC4/WG5.

3. Technical approach and expected outcomes

IS4ALL seeks to collect data by:

- defining an appropriate set of instruments to elicit and document best practice and experience in the area of Universal Access; some of these instruments may be reference case studies on how Universal Access is

being practised, subcontracts to experts to provide state of the art reports on technologies, and application areas, as well as on site visits, interviews, etc.

- extracting and developing scenarios (relevant to a regional Healthcare Telematics network as well as the industrial participants) to demonstrate the validity and applicability of such a code of practice; these scenarios will be formulated around an agreed common theme, namely electronic healthcare records; the specifics of each scenario will be decided by the Working Group within the first three months of its life;

In subsequent phases, and based on the above data, the project will:

- consolidate these findings into a code of Healthcare Telematics practice;
- develop a validation strategy for demonstrating the applicability of the recommendations by means of a collection of experimental prototypes which will embody the agreed Universal Access design code;
- disseminate the accumulated wisdom to the industrial, academic / research and standardisation communities through several outreach activities, including a Web site and seminars, participation in major international conferences, and by submitting technical reports to relevant standardisation bodies.

The methodological approach of the project links with recent developments in scenario-based analysis (Carroll, 1995; Carroll, 2001). The technical approach to be followed in IS4ALL builds on a scenario-based perspective to systems development. The IS4ALL Technical Annex describes the notion of scenarios as narrative descriptions acting both as design vocabularies and validation platforms. Used as design vocabularies, scenarios provide a “user” oriented language for understanding human activities. As an approach to evaluation, scenarios help define, focus and articulate an evaluation to suit specific requirements and intended objectives. In IS4ALL scenarios will be employed for both these purposes. Figure 1 depicts precisely this dual role of scenarios in the context of systems development. Specifically, as empirical tools, scenarios help the analyst to understand the existing structure and organization of tasks and to unfold prevailing patterns of use in a user community. At the same time, as analytical instruments, scenarios provide useful insights, which help re-engineer a process or artifact so as to make users aware (i.e. through prototypes) of the envisioned situation and the corresponding usage patterns.

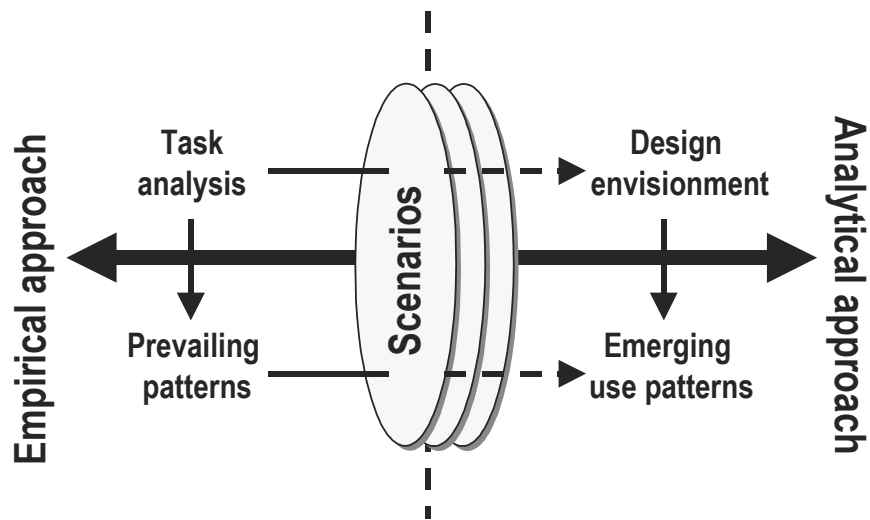


Figure 1: Scenarios provide a common design vocabulary and a minimal evaluation context

It is therefore proposed that “scenarios” in the context of IS4ALL are perceived as narrative descriptions of computer-mediated human activities in a Health Telematics environment. The social setting of a Health Telematics environment may be bound to a clinic within the hospital, a ward within a clinic or even to the end users business or residential environment. The scope of such scenarios is intended to be narrow and focused on a very specific issue. As an example, a possible scenario would be focused on patient’s access to the electronic health record from home, or while on the move, using a portable device, which runs Windows CE. Such a scenario may correspond with technical developments planned in the course of a EC-funded project (i.e., WARD-IN-HAND), or indeed it may identify post-project activities of potential interest to the project. In any case, it is intended to play a dual role. In the first place, it should describe a clear and unambiguous design resource. Secondly, it should offer a reference point for validating IS4ALL instruments. As a design resource, it may be used by IS4ALL to extract parameters, which should appear in, for instance, the Universal Access Context Description interview. As a validation platform, the

scenario may be used to test the compiled Universal Access Description interview to assess how well it fits the specific scenario.

From the above brief description, two points need to be clarified. First of all, scenarios in IS4ALL do not imply any form of technical development other than compiling drafts of the project outcomes. It should be noted, however that some of these outcomes would require the availability of some sort of prototypes to assess their validity. In such cases and only for the purposes of validation of a particular instrument, is IS4ALL planning to undertake (minor) technical developments. For instance, such a technical development would be to design and prototype an interaction style suitable for interacting with (parts of) EHRs using a mobile device. Secondly, in case a scenario relates explicitly to an EC-funded project, then the liaison with the project will not affect the project's technical plans. In other words, IS4ALL will not be asking these projects to carry out additional activities other than those planned in their technical annex. Instead, we will be asking these projects to respond to an IS4ALL instrument, as part of the instrument's validation strategy. Thus, the liaison with the projects will be based on a clear and well-formulated protocol whereby IS4ALL proceeds independently from the technical developments of other projects.

Having elaborated the methodological protocol to be followed by IS4ALL, we now turn to consider some of the quality attributes that should characterize the reference scenarios of IS4ALL. Some of the attributes that are considered important are as follows:

- Unfold the diversity that characterizes the use of EHRs; as already pointed out this could be a complex endeavor and we anticipate to focus on a few well defined cases;
- Reveal current and anticipated use of EHRs; anticipated use in this context, refers to studying a forthcoming situation which is not supported by current practices- for example, devising a suitable metaphoric representation and style of interaction for accessing an HER from a mobile device with limited display capabilities.
- Provide a context for design rationale; this implies that scenarios should provide sufficient details of interactive episodes in real contexts of use so that analysis of desired/undesired user consequences can be undertaken
- Completeness; a scenario is complete when it provides all the information needed for further refinement.

Scenarios can be developed at different levels. They can range from vision-oriented statements of intended actions to concrete experiences with an implemented artifact. For the purposes of IS4ALL, we identify three different levels for generating a useful scenario. These are described in Table 1.

Table 1: Levels of scenarios and corresponding input

Level 1:	Scenarios can express broad goals for a vision of a project.
Level 2:	Work practice scenarios are more concrete descriptions of specific work practices and goals, contributing directly to concrete requirements and design responsibilities.
Level 3:	Implementation scenarios depict human actions with technology and may be used to guide user and for product testing.

Scenarios, at any of these levels can be of benefit to IS4ALL depending on the phase of the project. Thus, in early stages, level-1 scenarios can help IS4ALL gain an understanding of the field of Health Telematics and define broad requirements for universal access. At later stages, however, level-3 scenarios become more useful as they provide concrete reference materials for design refinements or evaluation. In addition to the above classification, scenarios may have different focus. Table 2 identifies some plausible options with regards to the focus of a proposed scenario, but these suggestions are not exhaustive by any means.

Table 2: Focus of the scenario

Artifact:	Describes the experiences of users with an artifact. Requires the availability of a prototype through which the user gains hands-on experience.
Activity:	Aggregate description involving several artifact-scenarios to provide insight into how a particular activity is carried out through computer mediation.
Process:	These are descriptions of how a goal is achieved in terms of steps to be followed, work practices, physical environment and social context.

An IS4ALL scenario can therefore be of Level 1 (see Table 1) and focus on an artifact, an activity or a process (see Table 2). From the technical annex of IS4ALL, we have committed to developing scenarios, which focus on the Electronic Health Record. This is a construction, which provides a history of examinations and treatment received by a particular user stored in a digital format. An Electronic Health Record is an aggregate (or meta-) structure, which can be compiled from data residing in various sources or autonomous clinical information systems, which in turn, may be geographically dispersed and non-homogeneous in organization, structure and contents.

4. Concluding remarks

The workplan of IS4ALL is to be carried out by a consortium of partners (see Acknowledgement) which bring together a diverse range of competencies. Institutionally, the Working Group brings together four research institutes with proven track record across a range of technological fields including Healthcare Telematics, assistive technologies, Human Computer Interaction, Universal Access and technology management; and two consortia of Healthcare Telematics industry user groups, where most of the main industrial actors in the Healthcare Telematics in Europe participate. In addition, the co-ordinating contractor provides the link with HYGEIANet (Tsiknakis et al., 1997), the Regional Healthcare Network of Crete. All together, therefore, the members of the IS4ALL Working Group establish a rich reference ground to facilitate the contextual inquiries of the project.

In addition to the above, there will be several subcontractors who will be contacted in the course of the project and as the need arises. It should be mentioned that potential subcontractors have been active members in the context of the International Scientific Forum "Towards an Information Society for All" and therefore possess detailed knowledge on what the IS4ALL Working Group is setting out to achieve.

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IS4ALL comprises one co-ordinating partner, namely ICS-FORTH, and several member organisations, including Microsoft Healthcare Users Group Europe (MS-HUGE), European Health Telematics Association (EHTEL), Consiglio Nazionale delle Ricerche – Istituto di Ricerca sulle Onde Elettromagnetiche (CNR-IROE), Forschungszentrum Informationstechnik GmbH (GMD), Institut National de Recherche en Informatique et Automatique – Laboratoire lorrain de recherche en informatique et ses applications (INRIA) and Fraunhofer-Gesellschaft zur Foerderung der angewandten Forschung e.V. - Institut für Arbeitswirtschaft und Organisation (FhG-IAO).

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