DELIVERABLE REPORT
D10.3 (revised)
"Standardization"

collaborative project
MASELTOV
Mobile Assistance for Social Inclusion and Empowerment of Immigrants with Persuasive Learning Technologies and Social Network Services
Grant Agreement No. 288587 / ICT for Inclusion
project co-funded by the
European Commission
Information Society and Media Directorate-General
Information and Communication Technologies
Seventh Framework Programme (2007-2013)

Due date of deliverable:	March 31, 2015 (month 39)
Actual submission date:	October 7, 2015
Start date of project:	January 1, 2012
Duration:	36 months

Work package	**WP10 – Dissemination & Exploitation**
Task	**T10.3 – Standardization**
Lead contractor for this deliverable	**JR**
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Quality reviewer	**OU**

Project co-funded by the European Commission within the Seventh Framework Programme (2007–2013)		
Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

MASELTOV partner			organisation name	country code
01	JR		JOANNEUM RESEARCH FORSCHUNGSGESELLSCHAFT MBH	AT
02	CUR		CURE CENTRUM FUR DIE UNTERSUCHUNG UND REALISIERUNG ENDBENUTZER-ORIENTIERTER INTERAKTIVER SYSTEME	AT
03	AIT		RESEARCH AND EDUCATION LABORATORY IN INFORMATION TECHNOLOGIES	EL
04	UOC		FUNDACIO PER A LA UNIVERSITAT OBERTA DE CATALUNYA	ES
05	OU		THE OPEN UNIVERSITY	UK
06	COV		COVENTRY UNIVERSITY	UK
07	CTU		CESKE VYSOKE UCENI TECHNICKE V PRAZE	CZ
08	FHJ		FH JOANNEUM GESELLSCHAFT M.B.H.	AT
09	TI		TELECOM ITALIA S.p.A	IT
10	FLU		FLUIDTIME DATA SERVICES GMBH	AT
11	BUS		BUSUU ONLINE S.L	ES
12	BUS_UK		BUSUU ONLINE Ltd.	UK
13	FUN		FUNDACION DESARROLLO SOSTENIDO	ES
14	DAN		VEREIN DANAIDA	AT
15	MRC		THE MIGRANTS' RESOURCE CENTRE	UK
16	PP		PEARSON PUBLISHING	UK
17	ATE		AUSTRIAN INSTITUTE OF TECHNOLOGY	AT

At reporting time, organisations marked gray in the table above were not official partners of MASELTOV anymore

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1 EXECUTIVE SUMMARY

This report investigates the potential for introducing design aspects for mobile user interfaces as well as mobile applications in general into the future standards for accessibility.

Firstly, we give an introduction into the relevance for MASELTOV, as well as an overview of existing standards for accessibility, user interfaces and mobile applications. Secondly, the accessibility for the social target group of immigrants is discussed, taking the experience from the MASELTOV project into concern. Another aspect considers the standardization in mobile accessibility, as mobile applications impose specific constraints in the user interaction and the MASELTOV app (MApp) provides specific concerns that need to be considered for a design implementation.

The report concludes with a description of the contacting of stakeholders in the field of standardization and provides a short outlook on potential future strategies to take advantage of the complete experience made in MASELTOV and to aim at a concrete impact on future standards and normative requirements.

2 INTRODUCTION

2.1 OVERVIEW

This report considers the preparation of appropriate standards for ICT accessibility of immigrants. The project MASELTOV understood from the beginning that there is the potential that novel types of standards could be established based on the experience of this and other projects, with respect to the social target group of immigrants. There already exist standardization considerations for the elderly, for the accessibility of blind, paralysed people, or for children. Common for the specific design of any of these interface standards is that there was specific concern about the use and the affordances that the technology offers for the specific social target group. The motivation in MASELTOV, with respect to addressing the existing standards in accessibility, is to investigate in detail the opportunities for future attempts towards novel definitions of standardization in related fields, on the basis of the experience made in MASELTOV. The context of use includes direct use or use supported by assistive technologies. The overall accessibility may be affected by the context in which the ICT is used. This context could include other products and services with which the ICT may interact (Cooper et al., 2012; European Commission, 2005; European Telecommunications Standards Institute, 2015). The European standard (EN) accessibility requirements for the ICT domain (European Telecommunications Standards Institute, 2015) are at the beginning of the efforts to investigate specific technical specifications under consideration of immigrants' requirements.

2.2 STANDARDIZATION

A **standard**, formally, refers to a document that provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose[1]. **Accessibility** is the extent to which products, systems, services, environments and facilities can be used by people from a population with the widest range of characteristics and capabilities, to achieve a specified goal in a specified context of use.

Standardization is an activity of establishing, with regard to actual or potential problems, provisions for common and repeated use, aimed at the achievement of the optimum degree of order in a given context. In particular, the activity consists of the processes of formulating, issuing and implementing standards. Important benefits of standardization are improvement of the suitability of products, processes and services for their intended purposes, prevention of barriers to trade and facilitation of technological cooperation.

2.3 EUROPEAN STANDARDIZATION ORGANISATIONS

Three European Standardization Organizations (ESOs) are recognized by the European institutions as having the necessary ability and expertise to develop European Standards – identified by the code EN. These are:

- CEN – European Committee for Standardization
- CENELEC – European Committee for Electrotechnical Standardization
- ETSI – European Telecommunications Standards Institute

[1] http://www.iso.org/iso/home/standards.htm

The members of CEN and CENELEC are the National Standardization Bodies and Committees in 33 European countries. Through Technical Committees and other groups of interested stakeholders, the ESOs facilitate the development of European Standards and other consensus based publications.

Through the close relationship between CEN and the International Standards Organization (ISO) and CENELEC and the International Electrotechnical Committee (IEC), standardization work can take place in parallel at European and international level, and project proposers can easily access both markets.

The CEN-CENELEC Management Centre, located in Brussels, is in charge of the daily operations, coordination and promotion of all CEN and CENELEC activities. A dedicated team of experts help project proposers analyse standardization opportunities in their field and give advice on how standards can be integrated into R&I project proposals through the Research.

As far as Europe is concerned there are agreements between CEN and ISO (the Vienna Agreement) and CENELEC and IEC (the Dresden Agreement) which seek to avoid duplication of effort and under which (for example) a proportion (very high in CENELEC) of International Standards are adopted also as European Standards, usually without change.

2.4 NATIONAL STANDARDS

A National Standards Body (NSB) is responsible for the cataloguing and publication of national standards. It can be part of the structure of government or a non-governmental organisation. National Standards Bodies are almost always the national Member Bodies in ISO. The difference between formal and informal standards is in the representation of those involved in the development and approval processes.

For formal standards (at least in terms of the formal approval processes), the processes operate through national representation, rather than through organisation or individual representation, as is the case for informal standards. Thus, even if sometimes experts drafting material are attending in their own right, it is the national body membership that approves or disapproves the resulting documents, whereas participation in and approval of informal standards is on an organization and/or individual membership basis.

2.5 2015 EU ROLLING PLAN FOR ICT STANDARDIZATION

The EU Rolling Plan for ICT Standardisation, henceforth called the Rolling Plan (RP), is a document drafted by the European Commission, in collaboration with the European Multi-Stakeholder Platform on ICT Standardisation, henceforward referred as the "Multi-Stakeholder Platform" or "MSP". The MSP is an advisory group to the European Commission on matters of ICT standardisation policy; it includes Member States, European and global standardisation bodies, industry and association representatives.

This Rolling Plan provides a multi-annual overview of the needs for preliminary or complementary ICT standardisation activities to undertake in support of the EU policy activities. It is addressed to all ICT Stakeholders, standard makers or not, and gives a transparent view on how the policies are planned to be practically supported.

Thanks to the wide participation in its drafting, it achieves to picture a unique view of the landscape of standardisation activities in a given policy area. This year's Rolling Plan brings on table new policy areas: healthy ageing, advanced manufacturing, big data and PSI data

which are merged with the policy on open data, e-Infrastructures for research data and computing intensive science, broadband infrastructure mapping, and preservation of digital cinema.

The Rolling Plan comprises several chapters. The first two chapters provide an introduction, placing standardisation in the policy context. Chapter 3 is the heart as it lists all topic areas identified as EU policy priorities where standardisation activities play a key role in the implementation of the respective policy. Chapter 4 covers technologies of horizontal importance in the contexts of ICT infrastructures and ICT standardisation. In this new version, actions are numbered to enable an improved follow-up. The Rolling Plan is very rich in information about legal documents, available standards and technical specifications as well as ongoing activities in ICT standardisation. In order to keep this information up-to-date and make sure that new developments in the sector of ICT which is subject to fast progress one or more Addenda to the Rolling Plan may be published containing factual updates. These will be published alongside the Rolling Plan.

Big Data has been identified as one major topic in IT. In the following, we describe related standardization activities with Big Data including ISO/IEC JTC 1 in order to identify standards gaps. The current content is based on an informal survey by this Study Group and contributions from other SDOs. Specific Big Data standards are being developed by a variety of well-established SDOs and industry consortia as outlined in Table 1.

The following sub-clauses provide additional details on activities by those organizations that relate to Big Data,

- ISO/IEC JTC 1/SC 32, titled “Data management and interchange”
    - SQL is already adding new features to support Big Data. In addition, SQL has been supporting bi-temporal data, two forms of semi-structured data (XML and JSON), and multidimensional arrays. SQL implementations are known to exist, which utilize storage engines that are built using several of the NoSQL technologies, including name-value pairs, big table, and document. JSON is used in MASELTOV and from this the described activity is of high relevance to the MASELTOV project.
- ISO/IEC JTC 1/SC 38, titled “Distributed application platforms and services (DAPS)
- ITU-T SG13 Question17 with the title of “Requirements and capabilities for cloud computing based big data” in July 2013.
- W3c and Open Geospatial Consortium (OGC)
- Organization for the Advancement of Structured Information Standards (OASIS)
- Transaction Processing Performance Council (TPC)

Table 1 - The mission and key members of major Consortia for ISO/IEC JTC 1 Big Data standardization.

SDO/Consortium	Interests area on standardization	Main deliverables
ISO/IEC JTC 1/SC 32	Data management and interchange, including database languages, multimedia object management, metadata management, and e-Business.	e-Business standards, including role negotiation; metadata repositories, model specification, metamodel definitions; SQL; and object libraries and application packages built on (using) SQL.
ISO/IEC JTC 1/SC 38	Standardization for interoperable Distributed Application Platform and Services including Web Services, Service Oriented Architecture (SOA), and Cloud Computing	Cloud Data Management Interfaces, Open Virtualization Format, Web Services Interoperability
ITU-T SG13	Cloud computing for Big Data	Cloud computing based big data requirements, capabilities, and use cases.
W3C	Web and Semantic related standards for markup, structure, query, semantics, and interchange.	Multiple standards including ontology specification standards, data markup, query, access control, and interchange.
Open Geospatial Consortium	Geospatial related standards for the specification, structure, query, and processing of location related data.	Multiple standards related to the encoding, processing, query, and access control of geospatial data.
Organization for the Advancement of Structured Information Standards	Information access and exchange.	A set of protocols for interacting with structured data content such as OData (https://www.oasis-open.org/standards#odatav4.0), standards for security, Cloud computing, SOA, Web services, the Smart Grid, electronic publishing, emergency management, and other areas
Transaction Processing Performance Council	Benchmarks for Big Data Systems	Specification of TPC Express, Benchmark™ for Hadoop system and the related kit
TM Forum	Enable enterprises, service providers and suppliers to continuously transform in order to succeed in the digital economy	Share experiences to solve critical business challenges including IT transformation, business process optimization, big data analytics, cloud management, and cyber security.

Table 2 – Reference to standardization in the Description of Work (DOW) and coverage in D10.3 (revised).

DOW text location	DOW requirement	corresponding D10.3 content
"Task 10.3 Standards in ICT Accessibility", DOW p. 42	"Considering" the **preparation** of appropriate standards for ICT accessibility of immigrants	*Matching and identifying appropriate standards*
	"Towards the strengthening of the development of standards"	*Considering a new standardization specification on privacy*
	"Taking into account the existing standards"	*Referring to the state-of-the-art in standardization*
	"Aim at their further development"	*Contacting and cooperating with a National Standards Body*
	"**Consider** to establish a new standard of privacy"	*Considering a new standardization specification on privacy*
	"The European standard (EN) accessibility requirements for the ICT domain will be considered"	*Considering the relevant EN accessibility requirements.*
	"Standardization will be treated as discussion topic within each workshop dissemin. & exploitation activity"	*Standardization has been a topic in many plenary meetings.*
"Standardization Mandates", DOW p. 145	"Attempt in Task 10.3 on the **preparation** of appropriate standards for ICT accessibility of immigrants"	*Considering a new standardization specification on privacy*
	"Investigates progress towards the strengthening of the development of standards"	*Contacting and cooperating with a National Standards Body*
	"While taking into account the existing standards"	*Referring to the state-of-the-art in standardization*
	"Aim at their further development" [of the standards]	*Contacting and cooperating with a National Standards Body*
"B3.2.7 Standardization", DOW p. 154	"Each of the [different research] areas needs its own standardization adaptation and may lead to standard extension or new standards"	*Referring to the state-of-the-art in standardization*
	"Each partner, according to the agreed allocation, will • **keep in touch with standard organisations** in order to • **produce a state-of-the-art (SoA) analysis** with • recommendations for project adoption. • Existing SoA studies (such as CEN or ISO) will be fully taken into consideration."	*The cooperation with partners in the task led to the full outline of the report which includes as major deliverables:* *Referring to the state-of-the-art in standardization* *Considering a new standardization specification on privacy* *Contacting and cooperating with a National Standards Body*
	"MASELTOV [considers] mentally disabled through cultural barriers of language and culture"	*Considered in existing standards and requires novel as well.*
	"By using these results [being aware of the standardization mandate (M/376) to CEN, CENELEC, and ETSI in support of European accessibility requirements], **potential extensions** to standards **can be identified**."	*Referring to the state-of-the-art in standardization*
	"Partners will approach their assigned organisations with the objective to **establish cooperation agreements** (that will cover also IPR issues) and, possibly, working groups on knowledge spaces."	*Contacting and cooperating with a National Standards Body*
	"These actions [described one cell above]will be fully described in the **standards roadmap** of deliverable D10.3"	*Road map definition in cooperation with a National Standards Body*
	"In order to organise this process [of understanding, contributing and influencing standards and specifications], the partners will produce and **agree on a roadmap of activities** targeted to: •Get the project known internationally; •Get the most updated standards and specifications; •Influence them, when appropriate."	*Road map definition in cooperation with a National Standards Body*
Reviewers' feedback	"Deliverable D10.3 needs to be properly aligned with the DoW and resubmitted."	*This revised version of D10.3, alignment see Table 2.*
	"The document should be focused on the MASELTOV target group"	*Accessibility and MASELTOV specific learning aspects* *Accessibility for Immigrants UsingMobile ICT* *Considering a new standardization specification on privacy*
	"The deliverable concludes that steps towards standardization are out of the scope of MASELTOV, **making parts of this deliverable redundant**."	*New version covering DOW, see Table 2.*

3 CONSIDERING EXISTING STANDARDS FOR ICT ACCESSIBILITY OF IMMIGRANTS

Standards are a useful tool for ensuring that products and components are mutually compatible and that they will function properly when connected together – even if they were made by different companies in different countries[2]. This benefit of standardization is known as interoperability, and it is vital for numerous industries. Also the common functionality of the MASELTOV services strongly rest upon interoperability as the various services were developed by different partners. Existing standards and "pseudo" standards have been considered and appropriate pre-standardization developments within MASELTOV took place to ensure the applicability in different European countries considering different socio-economic structures.

One of the goals in MASELTOV was to identify EU ICT standardization topics and to start the accordant communication activities with stakeholders for convergence. We wanted to consider how to prepare appropriate standards and normative requirements (EN, EN ISO or ISO) for ICT accessibility of immigrants, while taking existing standards into account with the aim at their development in the future, i.e., beyond project duration. More concrete, a new standard of privacy should be established which guarantees that a mobile service provider must report about its level of data security in a periodic manner to independent NGOs and to governmental offices. As the MASELTOV project connects different research areas, each of the areas depends on its own standardization adaptation. Relevant existing standards from CEN or ISO have been taken into consideration to optimise efforts. In particular, considered the norms on European standard (EN) accessibility requirements for the ICT domain and intended to investigate them in terms of existing or lacking specific technical specifications under consideration of immigrants' requirements (see Section 4).

To understand, contribute and influence standards and specifications is a complex and self-paced process. In order to organise this process, the MASELTOV partners set up and agreed on a roadmap like collection of necessary activities (see section 4). According to this roadmap, partners may approach their assigned organisations in the future with the objective to establish cooperation agreements (that will cover also IPR issues) and, possibly, working groups on knowledge spaces.

Further necessary steps are:

- Get the project known internationally (during and after project time);
- Get the standards and normative requirements that are valid and most related today (during and after project time);
- Influence them, when appropriate (after project time).

[2] http://www.cen.eu/about/roleeurope/society/pages/default.aspx

3.1 STATE-OF-THE-ART IN ACCESSIBILITY STANDARDS

3.1.1 ÖNORM EN ISO 9241-110:2008 09 01: ERGONOMICS OF HUMAN-SYSTEM INTERACTION - PART 110: DIALOGUE PRINCIPLES (ISO 9241-110:2006)

This part of ISO 9241 sets forth ergonomic design principles formulated in general terms (i.e. presented without reference to situations of use, application, environment or technology) and provides a framework for applying those principles to the analysis, design and evaluation of interactive systems. While this part of ISO 9241 is applicable to all types of interactive systems, it does not cover the specifics of every context of use (e.g. safety critical systems, collaborative work). It is intended for the following types of users:

- Designers of user interface development tools and style guides to be used by user interface designers;
- User interface designers, who will apply the guidance during the development process;
- Developers, who will apply the guidance during design and implementation of system functionality;
- Buyers, who will reference this part of ISO 9241 during product procurement evaluators, who are responsible for ensuring that products meet its recommendations.

This part of ISO 9241 focuses on dialogue principles related to the ergonomic design of the dialogue between user and interactive system, and does not consider any other aspect of design such as marketing, aesthetics or corporate design. The list of recommendations for each of the dialogue principles is not exhaustive.

The following principles are *general* ergonomic design aspects, i.e. they are described without any relation to usage context, application context and technology used. They provide a frame for designing and evaluating interactive systems which is especially important for groups with fewer technology experience including groups of recent immigrant that for example come from third world or underdeveloped regions or countries.

- Suitability for the task: An interactive system is suitable for the task when it supports the user in the completion of the task, i.e. when *the functionality and the dialogue are based on the task characteristics* (rather than the technology chosen to perform the task).
- Suitability for learning: A dialogue is suitable for learning if it *supports and guides the user in learning to use* the interactive system.
- Suitability for individualisation: A dialogue is suitable for individualisation if the dialogue system permits *adjustments to the requirements of the work task*, as well as to the individual capabilities, skills and preferences of the user.
- Conformity with user expectations: A dialogue is *conform with user expectations* if it is in line with user concerns that can be predicted based on the usage context and with generally accepted conventions.
- Self-descriptiveness: A dialogue is self-descriptive if each *individual dialogue step is immediately comprehensible* through feedback from the dialogue system or an explanation is given on user request.
- Controllability: A dialogue is *controllable if the user is able to launch the dialogue sequence*, as well as influence its direction and speed until the objective has been attained.

- Error tolerance: A dialogue is fault-tolerant *if in spite of discernible faulty user input the intended work result can be achieved* either with or without a minimum of correction input on the part of the user.

3.1.2 ÖNORM EN ISO 9241-171:2008 11 01 ERGONOMICS OF HUMAN-SYSTEM INTERACTION - PART 171: GUIDANCE ON SOFTWARE ACCESSIBILITY (ISO 9241-171:2008)

This standard is based on the current understanding of *attributes of person's having special needs* because of some form of *physical, cognitive or sensory limitations*. Nevertheless, lack of accessibility is a problem that concerns many groups of people.

Immigrants form a very heterogeneous group with very different needs depending on physical, cognitive and social constitution. They show high variability of these constitutions below and above the "average immigrant user". Experience is also an important factor in effectiveness and efficiency of using smart devices for MASELTOV.

This standard on accessibility addresses a preferably high amount of user groups with the goal to increase the usability of a system. Although it is not explicitly dedicated to immigrant groups having different cultural backgrounds, they would nevertheless benefit from following these guidelines.

They comprise the following principles:

- Equitable Usage: Equitable solutions provide the same means of use for all users: identical whenever possible; equivalent when not. Achieving equitable use will ensure that solutions designed to increase accessibility *do not result in such things as loss of privacy, increased risks to personal safety or security, or the stigmatization of individuals*.
- Suitability for a preferably broad range of usage: The design of an interactive system has the goal to find solutions for a *preferably broad range of users* and takes their various capabilities and contexts into account.
- Robustness: An interactive system should be robust in the sense that it allows the *integration of current and future assistive technologies*, e.g. translators.
- Perceivable: The content should be presented in a way that *users can understand* it

The verification points that are shaping the guidelines are classified in a hierarchy according to their accessibility level at 3 different levels, known as A, double A or AA and triple A or AAA, with priorities low (or priority 1), middle (or priority 2) and high (or priority 3) respectively. As a concrete example, note that currently the University Web Accessibility Policy[3] requires that all web content conforms to the WCAG 2.0 Conformance Level AA.

1. **Level of accessibility A**: indicates the Level A success criteria required to be fulfilled, for example, by the Web developer, so that certain groups of users ***can access*** the content of the Web page.
2. **Level of accessibility AA**: indicates the Level A as well as Level AA success criteria required to be fulfilled, for example, by the Web developer, so that certain groups of users ***do not have serious difficulties to access*** the content of the Web page.
3. **Level of accessibility AAA**: indicates the Level A, Level AA as well as Level AAA success criteria required to be fulfilled, for example, by the Web developer so that certain groups of users ***do not have difficulties to access*** the content of the Web page.

[3] www.bristol.ac.uk/university/governance/policies/full-access.html, „Web accessibility and why it matters", University of Bristol

The hierarchy presented by these requirements determines the legal obligation of compliance by all contents published on the Web. In this regard, different countries have adapted their legislation according to the publication of the standards by ISO.

3.1.3 GENERAL ACCESSIBILITY GUIDELINES FROM W3C

Following accessibility guidelines will make content accessible to a wider range of people with disabilities, including sight impairment and decreased vision, deafness and hearing loss, learning disabilities, cognitive limitations, limited literacy, speech disabilities and combinations of these. If all these guidelines are applied websites and applications are not only accessible for older adults but *also increase understand-ability for immigrants*.

The consortium would like to particularly emphasise that it is fully aware about the objectives of these guidelines being in the range of impaired and disabled users, however, it agrees on the opinion that these accessibility guidelines include some principles that are of interest for the interface designer who intends to prepare interfaces for immigrants and in this sense *these guidelines have to be considered* in order to prepare guidelines that are particularly of importance for the immigrant user group.

In order to highlight the relevance to the context of MASELTOV's target user groups, we are adding to each of the key aspects of context of MASELTOV's target user groups a specific comment that supports the understanding of the specific relation between the requirements of immigrant's mobile interface usage and the guidelines.

The following are the *accessibility guidelines* of the W3C (World Wide Web Consortium - the main international standards organisation for the world wide web):

- **Perceivable - Information and user interface components must be presentable to users in ways they can perceive**
  - Text Alternatives: Provide *text alternatives for any non-text content* so that it can be changed into other forms people need, such as large print, braille, *speech, symbols or simpler language*. Exceptions for this rule are input controls, tests, sensory and decoration.
  - Time-based Media: Provide alternatives for time-based media.
  - Adaptable: Create *content that can be presented in different ways* (for example simpler layout) without losing information or structure.
  - Distinguishable: Make it easier for users to see and hear content including *separating foreground from background*.
  - Specific relation to the context of MASELTOV's target user groups: in particular, for users who have difficulties in understanding a new language and design culture, it certainly becomes very important that concepts are represented symbolically.
- **Operable - User interface components and navigation must be operable**
  - Enough Time: Provide users enough *time to read and use* content
  - Navigable: Provide ways to *help users navigate, find content, and determine* where they are
  - Specific relation to the context of MASELTOV's target user groups: MASELTOV has run a study on the navigation of users in unknown environments and it has proven the specific needs of immigrant users on the design of navigation devices (Paletta et al., 2015).

- **Understandable - Information and the operation of user interface must be understandable**
  - Readable: Make *text content readable and understandable*
  - Predictable: Make Web pages appear and operate in predictable ways
  - Input Assistance: Help users avoid and correct mistakes
  - Specific relation to the context of MASELTOV's target user groups: Misunderstanding of readable text is easily found with immigrants since their understanding of the host language usually will be poor and text will be interpreted with the common sense of the own or already know languages that are different to the host language.
- **Robust - Content must be robust enough that it can be interpreted reliably by a wide variety of user agents**
  - Compatible: Maximize compatibility with current and future user agents, including assistive technologies
  - Parsing: Using mark-up languages, elements have complete start and end tags, elements are nested according to their specifications, elements do not contain duplicate attributes, and any IDs are unique, except where the specifications allow these features.
  - Name, Role, Value: For all user interface components the name and role can be programmatically determined; states, properties, and values that can be set by the user can be programmatically set; and notification of changes to these items is available to user agents, including assistive technologies
  - Specific relation to the context of MASELTOV's target user groups: The relation to "Robustness" strongly refers to the principles that are of relevance with respect to "Understand-ability", see above.

3.2 ACCESSIBILITY AND MASELTOV SPECIFIC LEARNING ASPECTS

Accessibility standards typically take functionality or content based approaches. For example standards such as 'Accessibility requirements suitable for public procurement of ICT products and services in Europe' describe the functionality that should be in place to make ICT products and services accessible to users with a range of disabilities. In the same line of argumentation, the 'Web Content Accessibility Guidelines (WCAG) 2.0' describes characteristics of content and functionality that should be in place to maximise accessibility. These standards do not take account of the users' goals (Cooper et al., 2012) which means that whilst they state how an item of web content or software should function, they do not indicate how it should allow a user to achieve a goal. The **ability** to achieve a specified goal in a specified context of use is key to the concept of accessibility as indicated in the introduction (see Section 2 of this deliverable).

3.2.1 FROM STANDARDS TO IMPLEMENTATIONS

Learning content such as the Language Lessons that are provided within the MASELTOV mobile application (called "MApp" in the MASELTOV project) have explicit or implicit learning outcomes which the user is intended to achieve if they make use of the content, i.e. these learning outcomes are the goals that a MApp user will be aiming for. To **maximise accessibility** a mobile application should provide a way for all users to achieve their **particular learning goals**.

For example, within the MApp there are language lessons that ask learners to listen to a word, then to select the image corresponding to the word from a group of four images by tapping the relevant image on the screen. This lesson is intended to enable the user to evaluate their listening and comprehension skills. If we consider this lesson, for example, from three perspectives of three different users, *(1) User with limited dexterity, (2) Blind user, (3) Deaf user,* then it becomes clear that different solutions are necessary for users with 'limited dexterity' to those with 'no (or limited) vision'. It is also clear that this particular lesson is not appropriate for a totally 'deaf user'.

The functional statement for usage without vision (European Telecommunications Standards Institute, 2015) - "Where ICT provides visual modes of operation, some users need ICT to provide at least one mode of operation that does not require vision" - is appropriate. To assist a blind or partially sighted user, the audio alternative to the images should be in the user's native language and the interface for selecting an answer may be delivered via audio. However, it is in cases such as this, and others - e.g., a user with limited dexterity - that the preferred alternative may be another medium, i.e., that the learning outcome may be best achieved via a lesson with the same intended learning outcomes delivered via a web browser through either a tablet or PC.

This example demonstrates that standards alone are not sufficient. The example does not state that we relate to users with limited dexterity, blind and deaf users, but instead highlights the principal requirement to implement means to efficiently address the objective of the standards.

In addition to standards such as WCAG and ETSI there is a need for an organisation creating apps to follow a procedure to ensure that accessibility is maximised. In higher education, many universities have a documented process, in addition to following given standards, in order to ensure that their course materials are accessible to students (The Open University, 2015). Many other organisations have one or more of

- *a set of guidelines,*
- *a process,*
- *and professional development activities for their staff,*

with the aim of maximising the accessibility of their products, such as, the BBC resources (BBC, 2015).

In United Kingdom, the British Standards Institute has documented a process for web products, and (Cooper et al., 2012) reflect on it; they remark that it requires actions by the providers of a web product throughout the complete lifecycle of the product to enable maximum accessibility. Though this process is targeted at providers of web products, it could be adapted to meet the needs of organisations providing mobile apps in general, and those targeted at immigrants in particular.

A further aspect that a process on maximisation of accessibility would need is to consider the potential of conflicts and interference between services provided by a device's OS and an app's functionality to support learning.

3.2.2 SPECIFIC RELATION TO MASELTOV

For example, in MASELTOV Deliverable D9.4 (Schwarz et al., 2015) describe problems that occurred for Spanish native speakers whose phones had been set to use Spanish as the default language in order to aid overall understanding of a new smartphone. Spell checking and auto-

correction of English words to Spanish ones interfered with their attempts to write forum posts in English in the MApp. The spell checking and auto-correction feature which is an aid to 'normal' users was a hindrance to language learning.

As a conclusion, any process aimed at improving accessibility should provide guidance on how to minimise the effects of this kind of interference.

3.3 MOBILE ACCESSIBILITY

Mobile devices are currently one of the most important tools for creating and maintaining social links. They comprise a large set of applications and functionalities that make them the ultimate communication tool, always within reach. The inability to control such devices is likely to exclude people from opportunities in several domains: work, entertainment, healthcare, shopping, transportation, and so forth.

Mobile devices are expected to work in wide demographics, independently of social or economic status, age, preferences, values, or culture (Budde, 2009). The diversity of their target audience is enormous and each individual has a very different set of requirements.

Current mobile interfaces, however, do not address the need of global accessibility well. For instance, older adults may require larger targets and font size, due to increased physiological tremor and visual impairment. Auditory feedback and new touch-based exploration mechanisms are required for blind people. On the other hand, motor-impaired users may prefer voice interaction or alternative interaction styles rather than gesture and direct manipulation. And finally, immigrants might require extended consideration of privacy aspects, guaranteed use of connectivity, etc. All in all, mobile interfaces need to address a wide range of abilities by supporting parameterizations and adaptations, allowing its end-users to fully control their devices (Nayebi et al., 2012).

Usability and satisfaction in use of a mobile device is closely linked to general accessibility of mobile devices. According to (Nayebi et al., 2012), there are three aspects of usability for all types of software that are important to consider when considering *mobile accessibility*:

- **More efficient to use**: takes less time to complete a particular task.
- **Easier to learn**: operations can be learned by observing the object.
- **More user satisfaction**: meets user expectations.

The Consolidated Usability Model - an enhanced usability model proposed by (Abran et al., 2003) was based on the (EN ISO 9241; EN ISO 9241-210; Dix et al., 1993; Nielsen et al., 1994) based usability models - defines usability as a combination of parameters, such as, effectiveness, efficiency, learnability, satisfaction, and security, with a recommended set of related measures.

EN ISO 9241 also consists of the following parts, under the general title Ergonomics of human-system interaction, and we selected specific aspects that are of particular concern for immigrant specific interfaces:

- Part 20: Accessibility guidelines for information/communication technology (ICT) equipment and services
- Part 110: Dialogue principles
- Part 129: Guidance on software individualization
- Part 171: Guidance on software accessibility
- Part 210: Human-centred design for interactive systems

- Part 304: User performance test methods for electronic visual displays
- Part 306: Field assessment methods for electronic visual displays
- Part 400: Principles and requirements for physical input devices
- Part 410: Design criteria for physical input devices

The following parts are under preparation:

- Part 143: Form-based dialogues
- Part 154: Design guidance for interactive voice response (IVR) applications

Furthermore, ISO/IEC 25010 25010 defines *satisfaction in use* as:

- **Likeability**: satisfaction of pragmatic goals
- **Pleasure**: satisfaction of hedonic goals
- **Comfort**: physical satisfaction
- **Trust**: satisfaction with security

According to (Nayebi et al., 2012) there are hands-on methods for measurements being designed to measure the usability of a mobile application and that require an approach defined by (ISO/IEC 15939). The (ISO/IEC 15939) standard is actually breaking down the process of measuring by the definition of **base measures** which are derived measures using a *measurement function*, and *indicators* resulting from the *analysis of derived measures*.

In terms of satisfaction of pragmatic goals, one recommendation that was reported in MASELTOV deliverable D2.2.2 (Ros et al., 2014) was associated with the cost of using services whilst mobile:

"RECOMMENDATION: For this reason, we think that the MApp should be sensitive towards all immigrants and make special efforts to offer them the possibility of using as many services as possible without requiring a continuous internet connection" (MASELTOV, D2.2.2, page 35).

This in fact represents a very concrete **requirement** to make services accessible without an internet connection and it could be possibly included in one or more of accessibility guidelines, standards and/or processes. In this context it is well noted that MASELTOV considered independence from connectivity as an important requirement to be accessible by people with low income. Note that the (i) Serious Game, (ii) Translation Tool and (iii) Language Learning services within the MApp actually work without an internet connection.

4 ACCESSIBILITY FOR IMMIGRANTS USING MOBILE ICT

In communication with the NGOs that are participating in MASELTOV – MRC, FUN, DAN – and through the experience that was collected from the feedback of the individual test participants in the user-centred design approach, in particular, considering the first and the final field trials, several issues were identified, extracted and mentioned that could become the basis of further standardization concerns:

- **Extended requirement for privacy**. Many immigrants have decided to leave their home for the insecure life circumstances in their country; they probably had difficult circumstances during their travel to the host country and might have had bad personal experience when they lived in poverty. As a consequence, many immigrants are very suspicious about the distribution of their personal data and do not trust governmental

resources a priori. Instead, interface designers have to care for the management of personal data in a much more sensitive way. Psychologically, it will be relevant to inform the user in any circumstances about where her data are stored to or retrieved from. To increase the trust, mobile service provider should be regularly evaluated by neutral reviewers for whether all conditions of privacy had been met and in this manner all requirements fulfilled. Probably, an NGO could take the role of this since immigrants have a trust in the NGOs that they visit on a daily schedule. In total, this needs a highly careful treatment of any privacy issues, such as, to guarantee that a mobile service provider must report about its level of privacy and data security in a periodic manner to independent NGOs and to governmental offices.

- **Availability of connectivity**. Since connectivity can be crucial for many mobile service components, it has to be made certain, that these components obtain a sufficiently fast internet connection, or an alternative source of data, or been designed to enable WLAN based access of internet data in urban environments where the immigrants' services are meant to be relevant.
- **Consideration of language barriers**. It is outstandingly important to make services accessible in any language that the immigrant might require for the understanding of options, choices and information. Any use of language has to be carefully applied, it is highly necessary to involve translators that are experienced in ICT terminology and how to introduce these to people without any knowledge before about the functionality presented in the application.
- **Economic aspects that impact the design**. Some design aspects can be applied taking economy into concern, since, typically, recent immigrants are supposed to keep costs as low as possible. Concerns can be taken by planning to involve a minimum of connectivity requirements, or connection time, as well as by considering to involve coverage of costs through advertising as the business model.

5 CONSIDERATIONS TOWARDS A NEW STANDARD OF PRIVACY

5.1 INTRODUCTION

In this Section we consider how standards could be used to guarantee a MApp user's privacy, and influence the security of their personal data. To do this we reflect on a variety of sources of information including the analysis of privacy, trust and data security reported in MASELTOV Deliverable D5.3 (Efremidis et al., 2014). We reflect on this in the light of the views of immigrants on privacy collected during the MASELTOV field trials as reported in MASELTOV D9.4 (Schwarz et al., 2015). The data reported in that Deliverable confirm that maintaining personal privacy is an important issue for participants in all of the groups covered in the main field trial, and that participants from all groups were concerned that the MApp service should protect their privacy. We consider this in the light of progress of EU policy related to privacy and data protection since MASELTOV deliverable D5.3 was published.

Further matching with the existing norms and projects within the ISO/IEC DIS 27000 (Information technology -- Security techniques -- Information security management systems -- Overview and vocabulary) will be necessary to get a precise and profound understanding of the necessary steps towards the inclusion of MASELTOV requirements.

5.2 TOWARDS A PRIVACY STANDARD

5.2.1 RECENT DEVELOPMENTS WITHIN THE EU

As reported in D5.3, a new regulation on data protection is being negotiated within the EU with the intention that it is in agreed and in place by the end of 2015. Since D5.3 was published, the second round of negotiations on this new EU General Data Protection Regulation (GDPR) has taken place. All IT norms are worked out on the level of ISO/IEC and will need further attention.

The European Parliament, the Commission, and the Council have all agreed on a number of critical elements that form the foundations of this reform:

- A single set of rules on data protection, valid across the EU.
- Reinforced rights to put people in control over their data.
- The same rules for companies from the EU and from outside the EU.
- A strong and effective one-stop shop mechanism to simplify the lives of companies and citizens.

More details can be found in the remarks by the European Commission, i.e., by Mrs. Jourová (European Commission, 2015), after the launch of the Data Protection Regulation *trilogue* (involving the European Parliament, the Commission, and the Council).

The three institutions are committed to dealing with the GDPR as part of the wider data protection reform package composed of the GDPR itself, and a proposed directive for police and judicial activities that would govern personal data processing by law enforcement bodies and other agencies in criminal cases[4]. The legislative process should conclude at the end of 2015 and likely allow for formal adoption of both instruments in early 2016, to be followed by a two-year transitional period. We note that as reported in D5.3, a Directive allows member states to interpret the guidelines in their own way whereas a new regulation will become law in all EC countries. One of the purposes of the GDPR is to remove the fragmentation that has resulted from different interpretations of the EU 1995 Data Protection Directive, and enable any EU consumer who has a complaint against a company in an EU country that is not their own, to act with ease.

The EU agency dedicated to protecting personal data and privacy and promoting good practice in the EU institutions and bodies is the European Data Protection Supervisor (EDPS). The purpose of this role is to act as an independent supervisory authority with the responsibility of monitoring the processing of personal data by the Community institutions and bodies, advising on policies and legislation that affect privacy and cooperating with similar authorities to ensure consistent data protection. With this in mind, we look at the EDPS's recommendations about the developing GDPR and associated directive, in the light of the requirements of immigrants, and of potential MApp service providers.

[4] Proposal for a directive of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data by competent authorities for the purposes of prevention, investigation, detection or prosecution of criminal offences or the execution of criminal penalties, and the free movement of such data
http://register.consilium.europa.eu/doc/srv?l=EN&f=ST%205833%202012%20INIT

5.2.2 RECOMMENDATIONS FROM THE EUROPEAN DATA PROTECTION SUPERVISOR

On 27 July 2015 the European Data Protection Supervisor sent his recommendations to the EU co-legislators negotiating the final text of the General Data Protection Regulation (GDPR). In his recommendations, the European Data Protection Supervisor is concerned with three major themes, as follows,

1. A better deal for citizens,
2. Rules which will work in practice,
3. Rules which will last a generation.

The drafts being discussed in the trilogue (involving the European Parliament, the Commission, and the Council) revolve around "the protection of individuals with regard to the processing of personal data and rules relating to the free movement of personal data" (European Data Protection Supervisor, 2015a).

So, although immigrants are not necessarily citizens of the EU, the issues raised deal with personal privacy and so are applicable to the case of immigrants. What is less certain is how the final legislation will relate to people who are not EU citizens.

Under the first theme of a "better deal for citizens", the recommendations relevant to MASELTOV and the MApp include, as follows,

"Unless and until there exists a clear and legally-binding definition for 'pseudonymised data' as distinct from 'personal data', this type of data must remain within the scope of data protection rules".

This point about '*pseudonymised data*' is relevant to MASELTOV because the data stored in the MApp User Profile can be considered to be '*pseudonymised*'.

"All data processing must be both lawful and justified" including the recommendation that

"Consent is one possible legal basis for processing, but we need to prevent coercive tick boxes where there is no meaningful choice for the individual and where there is no need for data to be processed at all. We recommend enabling people to give broad or narrow consent, to clinical research for example, which is respected and which can be withdrawn".

This recommendation suggests requirements that are consistent with 'privacy by default'. In Section 3.4 within D5.3 it was suggested that privacy information should be provided in was that are accessible to MApp users.

The recommendations call for more independent, more authoritative supervision e.g.

"Individual rights enforcement requires an effective system of liability and compensation for damage caused by the unlawful data processing. Given the clear obstacles to obtaining redress in practice, individuals should be able to be represented by bodies, organisations and associations in legal proceedings".

Under the second theme of "rules which will work in practice" the recommendations include

"Effective safeguards, not procedures. Documentation should be a means not an end to compliance; the reform must focus on results. We recommend a scalable approach which reduces documentation obligations on controllers into single policy on how it will comply with the regulation taking into account the risks, with compliance demonstrated transparently, whether for transfers, contracts with processors or breach notifications".

The point about demonstration of compliance is important for MASELTOV and the MApp and is discussed in the next section on immigrants' requirements.

"On the basis of explicit risk assessment criteria, and following our experience of supervising the EU institutions, we recommend requiring notification of data breaches to the supervisory authority and data protection impact assessments only where the rights and freedoms of data subjects are at risk. Industry initiatives, whether through Binding Corporate Rules or privacy seals, should be actively encouraged".

The last point about privacy seals is of particular interest as we discuss in the next Section on immigrants' requirements.

Under the third theme "Rules which will last a generation" the impact of rapid changes in technology is discussed, as follows.

"Recent years have seen an exponential increase in the generation, collection, analysis and exchange of personal information, the result of technological innovations like the internet of things, cloud computing, big data and open data, whose exploitation the EU considers essential to its competitiveness. Judging by the longevity of Directive 95/46/EC, it is reasonable to expect a similar timeframe before the next major revision of data protection rules, perhaps not until the late 2030s. Long before this time, data-driven technologies can be expected to have converged with artificial intelligence, natural language processing and biometric systems, empowering applications with machine-learning ability for advanced intelligence.

These technologies are challenging the principles of data protection. A future-oriented reform must therefore be predicated on the dignity of the individual and informed by ethics. It must redress the imbalance between innovation in the protection of personal data and its exploitation, making safeguards effective in our digitised society".

Relevant recommendations include "*Accountable business practices and innovative engineering*" which recommends fuller transparency from data controllers, and seeks to reverse secret tracking and decision making on the basis of profiles hidden from the individual. There is also strong support for the introduction of the principles of data protection by design and by default, and a recommendation of

"*…simpler wording for requiring the rights and interests of the individual to be integrated in product development and default settings*".

To empower individuals, consideration is given to data portability

"*We recommend allowing a direct transfer of data from one controller to another on the data subject's request and entitling data subjects to receive a copy of the data which they themselves can transfer to another controller*".

Lastly, with the aim of future-proofing the rules to be included in the GDPR, the EDPS recommends

"*…allowing a direct transfer of data from one controller to another on the data subject's request and entitling data subjects to receive a copy of the data which they themselves can transfer to another controller*".

5.2.3 IMMIGRANTS' REQUIREMENTS

A number of suggestions were made in deliverable D5.3 for a MASELTOV privacy policy framework. The suggestions can be grouped into three broad themes, i.e.,

1. Users are provided with comprehensive and easy to understand information about security settings.
2. Inform and warn users of the consequences of providing personal information (pros and cons), explaining how to turn off particular services when needed and to provide tips to avoid risky situations.
3. Privacy information is given to users in two ways:
   i) In a yes/no icon-based table, and presented in easy-to-read text in own language,
   ii) In a detailed note. Any information provided needs to be accessible to users.

Here we comment on these recommendations in the light of the evolving GDPR with reference to the recommendations made by the EDPS.

1. Users are provided with comprehensive and easy to understand information about security settings.
   EU legislation will likely mandate that information is provided in EU languages only. To achieve the provision of easy to understand information for the MASELTOV target user group will require a commitment beyond that likely to be required by the GDPR that is currently in development. One way such a commitment could be demonstrated by service providers is through adherence to a specially designed code of conduct, e.g. so as to gain a '*privacy seal*'.
2. Inform and warn users of the consequences of providing personal information (pros and cons), explaining how to turn off particular services when needed and to provide tips to avoid risky situations.
   This point relates to the use of '*pseudonymised data*' and to issues of consent as discussed under the theme of 'a better deal for citizens'. Even if the recommendations the EDPS are enshrined in the GDPR legislation, there may need to be additional requirements for the MASELTOV target group, in terms of the languages used to inform, and the way the issues are explained.
3. All MASELTOV tools and services promote 'privacy by design' and 'privacy by default'. Data protection safeguards are built into all products and services. Privacy by design and by default are explicitly mentioned in the EDPS's recommendations under the third theme "*Rules which will last a generation*".
4. Privacy information is given to users in two ways.
   i) In a yes/no icon-based table, and presented in easy to read text in own language.
   ii) In a detailed note. Any information provided needs to be accessible to users
   The third theme "*Rules which will last a generation*" includes a recommendation for the use of simpler wordings, however it does not go so far as to suggest use of icons or

other visual representations. This again may have to be effected via means of a 'privacy seal'.

The draft wording of the GDPR also includes wording about organisations having to "implement appropriate measures to ensure and be able to demonstrate that the processing of personal data is performed in compliance with this Regulation" *(Article 22, European Data Protection Supervisor, 2015a*). Under their second theme, the GDPS recommends that this should be effected 'transparently'. The requirements of a 'privacy seal' could outline the level and nature of the transparency required, if that within the final GDPR is not sufficient.

In conclusion, it is apparent that whilst the forthcoming GDPR and associated directive look to be a great step forward in terms of protection of privacy for EU citizens, the legislation alone may not be sufficient for MAppp users, in particular around the way that data protection and privacy issues associated with a service are explained to users.

A MASELTOV 'privacy seal' which makes explicit guarantees about clarity and representation of explanations of privacy and data protection in a variety of languages may be necessary to ensure that the needs of the MASELTOV target user group are met.

6 EUROPEAN STANDARD (EN) ACCESSIBILITY GUIDELINES ON ICT

6.1 INTRODUCTION

With the **ÖVE/ÖNORM EN 301549** there exists already a **given standard** with respect to the **accessibility aspects in ICT**.

Table 3 - from the ÖVE/ÖNORM EN 301549[5], V1.1.2:2015 06 01 - gives an overview on existing standards and guidelines on accessibility in ICT (European Telecommunications Standards Institute, 2015). This table contains referenced documents that are necessary for the application of the present document.

In the following we refer to specific **and selected aspects of the existing standards** that are of specific concern for the MASELTOV project, i.e., for the social target group of immigrants.

In this context it is noted that the European Commission issued a Standardization Mandate to CEN, CENELEC and ETSI in support of European accessibility requirements for public procurement of products and services in the ICT domain.

[5] http://www.etsi.org/news-events/news/754-new-european-standard-on-accessibility-requirements-for-public-procurement-of-ict-products-and-services?highlight=YTo2OntpOjA7czoyOiJlbiI7aToxO2k6MzAxO2k6MjtpOjU0OTtpOjM7czo2OiJlbiAzMDEiO2k6NDtzOjEwOiJlbiAzMDEgNTQ5IjtpOjU7czo3OiIzMDEgNTQ5Ijt9

Table 3 - Overview on existing standards and guidelines on accessibility in ICT (from ETSI EN 301 549; European Telecommunications Standards Institute, 2015).

Standard	Content
W3C Recommendation (11 December 2008)/ISO/IEC 40500:2012:	"Web Content Accessibility Guidelines (WCAG) 2.0"
ETSI EG 201 013	"Human Factors (HF); Definitions, abbreviations and symbols"
ETSI ES 202 975	"Human Factors (HF); Harmonized relay services"
ETSI TR 101 550	"Documents relevant to EN 301 549 "Accessibility requirements suitable for public procurement of ICT products and services in Europe"
ETSI TR 101 551	"Guidelines on the use of accessibility award criteria suitable for publicly procured ICT products and services in Europe"
ETSI TR 102 612	"Human Factors (HF); European accessibility requirements for public procurement of products and services in the ICT domain (European Commission Mandate M 376, Phase 1)"
ETSI TS 126 114	"Universal Mobile Telecommunications System (UMTS); LTE; IP Multimedia Subsystem (IMS); Multimedia telephony; Media handling and interaction (3GPP TS 26.114)"
ETSI TS 122 173	"Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; IP Multimedia Core Network Subsystem (IMS) Multimedia Telephony Service and supplementary services; Stage 1 (3GPP TS 22.173)"
ETSI TS 134 229	"Universal Mobile Telecommunications System (UMTS); LTE; Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification (3GPP TS 34.229)"
ÖNORM EN ISO 9241-110:2006	"Ergonomics of human-system interaction -- Part 110: Dialogue principles"
ÖNORM EN ISO 9241-171:2008	"Ergonomics of human-system interaction-Part 171: Guidance on software accessibility"
ÖNORM EN ISO 26800:2011 11 01	"Ergonomics - General approach, principles and concepts (ISO 26800:2011)"
US Department of Justice	"2010 ADA Standards for Accessible Design"
W3C Working Group Note 5 September 2013	"Guidance on Applying WCAG 2.0 to Non-Web Information and Communications Technologies (WCAG2ICT)"

7 ROADMAP AND CONCRETE FUTURE STEPS

7.1 INTRODUCTION

The MASELTOV project connected different research areas – usability engineering, serious games, transportation, mobile applications, etc. Each of these areas may need its own standardization adaptation in the future and may lead to standard extensions or new standards. That is why each partner, according to the agreed allocation, could be motivated in the future to keep in touch with organisations that are engaged in standardization in order to get opportunities to impact given standards and normative requirements.

By using the results from the MASELTOV project as a starting point, potential extensions to standards could be identified in the future. Based on the experience made in the investigation on standardization, partners are in general capable to approach their assigned organisations with the objective to establish cooperation agreements and, possibly, working groups on knowledge spaces.

However, to understand, contribute and influence standards and specifications is a complex and self-paced process.

The approach that was realized by JR and ASI can be understood as a 'proof-of-concept' of how such relationships may operate in future.

7.2 CONTACTING THE NATIONAL STANDARDIZATION BODY (NSB)

MASELTOV contacted Austrian Standards Institute (ASI), the National Standardization Body for Austria. ASI was founded in 1920 and is founding member of CEN (European Committee for Standardization) and ISO (International Organization for Standardization) in Vienna, Austria, who is expert in all aspects of standardization on a European level and consulting European research projects integrating knowledge on access to national, European and international standards as well as to support an appropriate match to innovation procedures. In particular, ASI is a center for providing services of standardization in Austria and provides access to national, European and international standardization. ASI itself does not work on standardization but it provides consulting by advising the specific technical committees.

JR contacted the ASI in the person of the Director of Standards Development, Dr. Karl Grün, who recommended to contact the Committee 001 on Information technology to MASELTOV. MASELTOV then contacted the Committee Manager, Dipl.-Ing. Jörg Nachbaur who then kindly agreed to provide major consulting on the specific issues of MASELTOV in the frame of standardization.

The scope of Committee 001 is the development of standards for information technology to improve the efficiency and quality of IT systems, to increase the security of IT systems and data, to support portability of application programs and to ensure the interoperability of IT products and systems and to harmonize development environments. The scope also includes the electronic payment transactions and banking business. The Committee is knowledgeable about all international standardization frameworks as well as developments towards novel standardization levels, it actually mirrors the IT standardization worldwide. For example, ASI cooperates within ISO/IEC JTC1 Information Technology with national experts and collaborates on numerous subcommittees (SC) of JTC. JTC was founded in 1987 and has so far published more than 2894 standards worldwide in the area of IT.

In order to being eligible to cooperate with other experts in the field of standardization, one first has to become member in a national mirror committee on IT, from this it is possible to get nominated as national (for example, Austrian) delegate to become member of a CEN or ISO Technical Committee, Sub-Committee or Working Group. In this Standardization Committee one represents Austria with the duty to feedback accordingly into the national (mirror-) Committee.

The National Committee represents the Austrian opinion on standardization which is generated in consensus with its specific rules of procedure and the international basic principles of standardization.

7.3 RECOMMENDATIONS FROM THE AUSTRIAN STANDARDS INSTITUTE

The targeted results of the cooperation between the Austrian Standards Institute (ASI) with the project MASELTOV were to align the observations of the MASELTOV standardization endeavors and its associated report with the expert based knowledge and view on European standardization and novel developments provided by the ASI.

In an additional step, the national Committee on Information technology (ASI K-001) is contacted by MASELTOV, a Committee that mirrors standardization in the field of IT and in which the content and results are presented to and discussed by nominated experts.

A potential result of that procedure that still is in operation could be a first step towards the generation of a national standard (in Austria called ÖNORM) with the working title "Requirements on web applications for the social inclusion of recent immigrants" - or even focused on the target user group of refugees, following the most recent developments in Central and Southeastern Europe.

As a second step, this national standard could provide the basis for a CEN or ISO project application in order to create a CEN or ISO standard. A successful example of an application of a national ÖNORM standard for the generation of an EN ISO specification was ÖNORM S 5730, "Investigation of constructions on pollutants and other injurious factors". This standard was developed in the Austrian Committee K-236 Indoor Air and then used as the basis for a New Work Item Proposal (NWIP) and finally became the standard ÖNORM EN ISO 16000-32, Indoor air - Part 32: Investigation of buildings for the occurrence of pollutants (ISO 16000-32:2014).

National standard that are used as a basis for a New Work Item Proposal in the associated CEN/ISO Technical Committees usually lead to a high level of acceptance of the already prepared content and from this lead to a much faster development of the project. In this manner, results of a research project lead to much faster development of innovations.

A further argumentation for the favor of a national project in the context of MASELTOV is that the content of the project MASELTOV can substantially aid in the actual challenges of the current European situation with international refugees.

The duration of such a project could be within a period of a single year since one could take advantage of already prepared content from the project MASELTOV.

7.4 OUTLOOK ON FUTURE STEPS

In future endeavours that would extend on the basis of the MASELTOV project results, it will be beneficial to involve Austrian Standards Institute (ASI) as a consortium partner. It will be mandatory to match latest information on standardization with the research objectives and the work within an appropriately focused research and innovation project. Targeted integration of standardization as a relevant part of project work can increase the innovation value of the research and innovation (R&I) project.

In the initial steps of a future project, it can be analysed which standards and details within would be most appropriate to be considered in the project. For example, the application of an appropriate terminology can assure a better communication between the consortium partners and that the procedures will be optimised and increase the efficiency of the project. Most importantly, already existing knowledge and standardization procedures will be matched and with the cooperation of a standardization expert, it will be hindered that already existing knowledge will be researched from scratch and still unexplored areas will be better identified and researched on so that innovations will be much better positioned.

In the final phase of the project and having finalized the research agenda, it will be important to align the results with the requirements of standardization, getting to know which results are eligible to impact any standard of the future and how to address these objectives. Apart from any national standard one could as well work on a European (CEN CWA Workshop Agreement) or international standard.

Once the content of project would be matched into novel standardization, the resulting standardization can become a provider of meaningful and efficient innovations for an existing or a developing market. Numerous R&I projects have successfully functioned as provider of standardization specifications: The technopolis study on the contribution of standardization to innovation in 1,830 European-funded (FP6 and FP7) research projects (Stroyan, 2013) comes to the conclusion that standards provided an important reference point and guiding framework for FP projects, ensuring tests and analytical work are carried out according to established norms, and technologies developed are interoperable with existing technologies and compliant with industry standards. By working to existing standards FP projects are more efficient and effective, produce higher quality results, and have an increased chance of their outputs being accepted by scientific and industrial communities. Working with existing standards also enables researchers to recommend and contribute to new standards development, thereby increasing their technical knowledge, widening their networks and strengthening the market exploitation of their results.

8 CONCLUSION

Work done in MASELTOV towards standardization can be considered in total as pre-normative work that principally matched already existing standards as candidates for further investigation and as baseline version for the development of novel standards. Concrete steps towards standardization were out of scope in the MASELTOV project, the objective was (i) to identify relevant existing normative requirements, as well as (ii) to relate these to the open issues in the frame of user interfaces for immigrants.

Next steps were to plan and to contact stakeholders in standardization and to discuss, if possible, prepare the introduction of some principles that are useful for immigrants into the future documents on normative requirements.

MASELTOV has identified and taken the required steps as outlined in the DOW and prepared the ground for the development of a standard, based on a National Standards Body (NSB) that has been identified and contacted concretely by the Austrian Standards Institute (ASI) in Vienna, Austria. The contact was very fruitful and led so far to a cooperation between the coordinating organisation, JOANNEUM RESEARCH, and the ASI on the matching of appropriate European standards in the context of MASELTOV.

Further cooperation is planned and already prepared as for the development of a standard in the context of recent developments in the context of immigration, related to the refugee crisis in Central and South-Eastern Europe.

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