D6.4.1
Standardisation Plan

Work package	**WP6 Business Model and Exploitation**
Task	**T6.4 Standardisation**
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Project PLAYTIME

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Contents

1 Executive Summary

This report provides a first plan about how to investigate the potential for considering standard design aspects for the serious game and training suite of PLAYTIME, in particular, with respect to its user interfaces

Firstly, we give an introduction into the relevance of standardization for PLAYTIME, as well as an overview of most related standards for accessibility, user interfaces and mobile applications in the context of ageing and dementia. Secondly, the accessibility for the vulnerable target group of persons with dementia, as well as their caregivers, is discussed, taking the experience in the PLAYTIME project into concern. Another aspect considers the standardization in mobile accessibility, as mobile applications impose specific constraints in the user interaction and the PLAYTIME app provides specific concerns that need to be considered for a design implementation.

The report concludes with a plan of forthcoming contacts with stakeholders in the field of standardization and provides a short outlook on potential future strategies to take advantage of the complete experience made in PLAYTIME for its potential impact on future standards and normative requirements.

2 Standardisation organisations

2.1 Introduction

This report considers the preparation of appropriate standards for ICT accessibility of persons with dementia (PwD). 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 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 PwD' requirements.

In this Task of the PLAYTIME project, the project team analyses the state-of-the-art and monitors potentially emerging standards and contributes actively to existing and new standards in design, technical and operational.

JRD will communicate with and refer to the Austrian Standards Institute (Vienna, Austria) and cooperate for standards development if applicable. The focus within PLAYTIME constitutes the integrated usage of established standards within the project and the feedback of project experiences and results. This means, in general, (1) analyzing the ICT accessibility standards, and if applicable, (2) contributing to the definition, development, support and usage of existing and new standards.

2.2 Standards

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. 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 Organizations (ESOs)

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

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 EU Rolling Plan for ICT Standardisation

2.5.1 Overview

The EU Rolling Plan for ICT Standardisation forms part of a short- to medium-term work programme in ICT standardisation. It is arranged by topic, linking EU policies to standardisation activities, and culminates in an annual report, such as, for 2018.

The, henceforth called the Rolling Plan (RP), EU Rolling Plan for ICT Standardisation 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 PLAYTIME and from this the described activity is of high relevance to the PLAYTIME 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)

2.5.2 Rolling plan for ICT standardisation 2018

In the published Rolling Plan for ICT standardisation 2018, there is a specific Section dedicated to the eHealth and Active and Healthy Ageing EU activities on standardization.

In 2016, CEN TC 251 started to work on standardizing an international patient summary, drawing from elements of the guidelines developed under the eHealth network. Completion of the standards is expected in 2018. This activity is funded by the Commission and ensures European participation to an international initiative that is expected to enable people to access and share their health data information for emergency or unplanned care anywhere and as needed.

In 2017, development of a European guidance document based on BSI PAS 277 for the use of the eHealth and wellness apps’ developers was started. This standardization activity will address some of the concerns related to the apps quality and reliability.

Besides already defined standardisation needs around citizens electronic health records; identifiers and identification processes; active living and ageing, this Rolling Plan also calls to assess whether a standardisation request might be needed pursuant to Regulation 1025/2012 for one or more European standardisation deliverable(s) concerning data protection by design for the development of eHealth products and services.

In summary, these activities will definitely be of importance for the PLAYTIME project and product in the future and therefore will be followed up as part of the PLAYTIME standardization plan.

2.6 State-of-the-art in accessibility standards

2.6.1 ÖNORM EN ISO 9241-110:2008 09 01: Ergonomics of human-system interaction – Part 110: dialogue pinciples (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.

2.6.2 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.

PwD form a rather heterogeneous group with gradually different needs depending on physical, cognitive and social deficiency in the functionality. Experience is also an important factor in effectiveness and efficiency of using smart devices for PLAYTIME.

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 vulnerable person groups having mental deficiencies, 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[1] 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.

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.

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

2.6.3 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 PwD*.

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 PwDs and in this sense *these guidelines have to be considered* in order to prepare guidelines that are particularly of importance for the PwD user group.

In order to highlight the relevance to the context of PLAYTIME's target user groups, we are adding to each of the key aspects of context of PLAYTIME's target user groups a specific comment that supports the understanding of the specific relation between the requirements of PwD'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 PLAYTIME's user group: in particular, for users who have difficulties in understanding complicated expressions in the language and graphical design, 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 PLAYTIME's target user groups: PLAYTIME's component amicasa has involved users in a previous field trial, including the navigation of users and has already impacted attemtpts to improved the interface (Paletta et al., 2018).
- **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 PLAYTIME's target user groups: Misunderstanding of readable text is easily found with PwDs since their understanding of a technically proned language usually will be poor and text will be interpreted with the common sense.

- **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 PLAYTIME's target user groups: The relation to "Robustness" strongly refers to the principles that are of relevance with respect to "Understand-ability", see above.

2.6.4 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: shopping, transportation, work, entertainment, healthcare, 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, in the frame of PLAYTIME, PwDs 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*.

2.6.5 Accessibility for PwD using mobile ICT

In communication with the social sciences partners with responsibilities for PwDs that are participating in PLAYTIME – Mental health Care Eindhoven and Sozialverein Deutschlandsberg – and through the experience that was collected from the feedback of the individual test participants in the user-centred design approach, in particular, considering previous, focus group based and the first field trials, several issues were identified, extracted and mentioned that could become the basis of further standardization concerns:

- **Consideration of language barriers**. It is outstandingly important to make services accessible in terms of the complexity level of the language for the understanding of options, choices and information. Any use of language has to be carefully applied, it is highly necessary to involve caregivers and psychologists acting as a kind of 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.
- **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 even in urban and rural environments where the PwD' services are meant to be relevant.

- **Extended requirement for privacy**. Data of PwDs are very sensitive and 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 vulneralble users. Such as, PwDs, have a trust in the caregivers that they visit, e.g., on a weekly 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.

2.6.6 European Standard (EN) accessibility guidelines on ICT

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

Table 1 - from the ÖVE/ÖNORM EN 301549[2], 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 PLAYTIME project, i.e., for the target group of PwDs.

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.

[2] 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 1 - 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)"

3 The National Standardisation Body and its Recommendations

3.1 Contacting the National Standardization Body (NSB)

JOANNEUM RESEARCH contacted the 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.

JOANNEUM RESEARCH had primary contact in the ASI in the person of the Committee Manager on Information Technology, Committee 001, Dipl.-Ing. Jörg Nachbaur who kindly agreed to provide major consulting on the specific issues of the project PLAYTIME 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.

3.2 First recommendations of the ASI

JOANNEUM RESEARCH has received a first recommendation by the Committee Manager on Information Technology of ASI, regarding the following Technical Committees of ISO:

- ISO/TC 314 Ageing societies,
- ISO/TC 173 Assistive products, and regarding
- 16 standardisation projects in the TCs, such as, ISO/DIS 21801 [Under development] on general guidelines on cognitive accessibility.

In this context it is of high relevance to know that the ISO/TC 314 on Ageing societies includes a working group ISO/TC 314/WG 02 "Dementia inclusive" that directly treats PwDs considerations. This working group is known to perform its first meeting November 5-7, 2018, in Hangzhou Shi, China. PLAYTIME is interested in getting to know about the results of this meeting.

The convenor of the working group on "**Dementia inclusive**", i.e., ISO/TC 314/WG 2, is Dr.-Ing. Thomas Linner and canbe reached through the secretariate, SO/TC 314 – Secretariat, BSI United Kingdom, British Standards Institution, 389 Chiswick High Road, London, W4 4AL, United Kingdom (Tel: +44 208 996 90 00, Fax: +44 208 996 74 00, Email: standards.international@bsigroup.com, Web: http://www.bsigroup.com). Secretariat direct: Ms Nele Zgavc, Tel: +44 (0) 208 996 7339, Email: Nele.Zgavc@bsigroup.com.

Another relevant working group in ISO/TC 173 has been identified, i.e., ISO/TC 173/WG 10 "**Assistive products for cognitive disabilities**". The convenor of tis working group is Mr. Trine Danielsen and can be reached thorugh the secretariat, SIS Sweden, Swedish Standards Institute, P.O. Box 45443, SE-SE-104 31 Stockholm, Sweden, Tel: +46 8 55 55 20 00 / +46 8 555 520 00, Fax: +46 8 55 55 20 01 / +46 8 555 520 01, Email: info@sis.se, Web: http://www.sis.se/, Secretariat direct: Mr Joakim Falk, Email: joakim.falk@sis.se.

A further pointer was given to the International Electrotechnical Commission (IEC) to IEC/SyC AAL on Active and Assistive Living. The scope of the systems committee is described as follows,

- Create a vision of Active Assisted Living that takes account of the evolution of the market
- Foster standardisation which:
  - enables usability and accessibility of AAL systems and services
  - enables cross-vendor interoperability of AAL systems, services, products and components
  - addresses systems level aspects such as safety, security and privacy
  - communicate the work of the SyC appropriately to foster a strong community of stakeholders

This Committee is hosting several norm projects, such as,

- Active Assisted Living (AAL) use cases IEC TS 63134 ED1

- Cooperative multiple systems in connected home environments - Functional safety of electrical/electronic safety-related systems - AAL aspects IEC 63168 ED1

The next activities in this task will be to contact the respective persons in the working groups of the Technical Committees.

3.3 Further opportunities with the ASI

The targeted results of the cooperation between the Austrian Standards Institute (ASI) with the project PLAYTIME were to align the observations of the PLAYTIME 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 PLAYTIME, 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 persons with dementia”.

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 PLAYTIME is that the content of the project PLAYTIME can substantially aid in the actual challenges of the current European situation with persons with dementia.

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 PLAYTIME.

4 Roadmap

4.1 Standardisation plan in PLAYTIME

According to the recommendations of the Austrian Standards Institute (ASI), the following activities will be performed until the next milestone in Task 6.4 (Standardisation, PLAYTIME Deliverable D6.4.2):

- Contacting the technical Committee, ISO/TC 314 Ageing societies, in particular, working group ISO/TC 314/WG 02 "Dementia inclusive
- Contacting the technical Committee, ISO/TC 173 Assistive products, in particular, working group ISO/TC 173/WG 10 “Assistive products for cognitive disabilities”,
- Collect information about the 16 standardisation projects in the TCs, such as, ISO/DIS 21801 [Under development] on general guidelines on cognitive accessibility.
- Collect information about the International Electrotechnical Commission (IEC), Subcommittee IEC/SyC AAL on Active and Assistive Living.

Regarding the following up of developing standards, PLAYTIME will follow up the following activities, as identified in Sec. 2.5.2,

- CEN TC 251 on standardizing an international patient summary, drawing from elements of the guidelines developed under the eHealth network. It will ensure European participation to an international initiative that is expected to enable people to access and share their health data information for unplanned care anywhere and as needed.
- Development of a European guidance document based on BSI PAS 277 for the use of the eHealth and wellness apps’ developers, addressing some of the concerns related to the apps quality and reliability.
- Activities on a call of the European Standardisatio Bodies to assess whether a standardisation request might be needed pursuant to Regulation 1025/2012 for one or more European standardisation deliverable(s) concerning data protection by design for the development of eHealth products and services.

Another version of the standardisation document, i.e., PLAYTIME Deliverable D6.4.2, will be dedicated to summarise the activities under the roof of this standardization plan and provide an outlook on the respective activities in the last project year.

4.2 Future standardisation activities’ opportunities

In future endeavors that would extend on the basis of the PLAYTIME 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.

5 Conclusions and Outlook

Work in development in PLAYTIME towards standardisation will 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 are out of scope in the PLAYTIME project, the objective is (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 PwD.

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

PLAYTIME has identified and taken the first required steps and will prepare the ground for the understanding of 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 already very fruitful and led so far to a further cooperation between the NSB, JOANNEUM RESEARCH, and the ASI on the matching of appropriate European standards in the context of PLAYTIME.

Further cooperation is planned and already prepared as for the development of better understanding of standards in the context of recent developments in the context of PwD.

6 Abbreviations

Table 1. *Abbreviations.*

Abbreviation	Description
ASI	Austrian Standards International
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
EN	European Standard
ESO	European Standardization Organization
ETSI	European Telecommunications Standards Institute
IEC	International Electrotechnical Committee
ISO	International Standards Organization
NSB	National Standardisation Body
ÖNORM	National Austrian norm that is published by the ASI
ÖVE	Austrian Community for Electrotechnics (Österreichischer Verband für Elektrotechnik)
PwD	Person with Dementia
TC	Technical Committee
WG	Working group

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(**European Commission, 2015**) Press release by the Commissioner Věra Jourová after the launch of the Data Protection Regulation trilogue, URL: http://europa.eu/rapid/press-release_STATEMENT-15-5257_en.htm

(**European Telecommunications Standards Institute, 2015**). Accessibility requirements suitable for public procurement of ICT products and services in Europe, ETSI EN 301 549. Brussels, 2015

(**ISO, 2011**) ISO 26800:2011: "Ergonomics - General approach, principles and concepts, International Organization for Standardization, Geneva, Switzerland.".

(**ISO/IEC 15939**) ISO/IEC 15939:2007 Systems and software engineering – Measurement process, International Organization for Standardization, Geneva, Switzerland.

(**ISO/IEC 25010**) ISO/IEC 25010:2011 Systems and software engineering --Systems and software Quality Requirements and Evaluation, International Organization for Standardization, Geneva, Switzerland..

(**ISO/IEC 9126**) ISO/IEC 9126 Software Product Evaluation – Quality Characteristics and Guidelines for the User, International Organization for Standardization, Geneva, Switzerland.

(**ISO/IEC 9241**) ISO/IEC 9241 Ergonomics requirements for office with visual display terminals (VDTs), International Organization for Standardization, Geneva, Switzerland.

(**ISO/IEC 9241-210**) ISO/IEC 9241-210: 2009. Ergonomics of human system interaction-Part 210: Human-centred design for interactive systems (formerly known as 13407). International Organization for Standardization (ISO). Switzerland, 2009.

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