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D7.3

Validation of the TN portal

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Revision History

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Statement of originality

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

Authors

Main authors

Jeanne Heijkers, Gert Jan Gelderblom, HZ

Contributors

Students Hogeschool Zuyd / HZ:

- Lisa Henning
- Corinna Laufer
- Laura Neubauer
- Tamara Steffens

Project co-ordination team (FDGCO):

- Renzo Andrich
- Sabrina Vincenti
- Valerio Gower
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Executive Summary

This deliverable reports on the results of the validation of the ETNA Information system. The validation activities considered the first release of the ETNA Information System which was published in February 2013. The validation was focused on the effectiveness of the system in meeting all information needs of the intended audience, and produced a set of recommendations for possible improvements to be implemented in the final release, which is expected end 2013.

This work is part of Work package 7 “Field tests, validation and launch”; it provides a substantial contribution to the technical and contents development work that has been carried out in the ETNA project so far.

The previous Deliverable 7.1 described the validation plan, providing all details of the validation methodology and the tools and methods to be used. The validation activities were focused on the main components of the ETNA Information System: the search interface, the data upload tool and the user rating and comments tool.

In the first chapter, the background of this evaluation is explained. The overall goal and research questions for the evaluation are detailed, including the items to be validated.

In the second chapter, the results are displayed for each component that was validated.

In the third chapter, a set of recommendations is provided for each item that was validated.

The final chapter summarises the main conclusions and raises a number of points for further discussion.
Background

Introduction

The overall goal of the ETNA thematic network was to establish a European Web Portal able to provide a unified access to information on European ICT assistive products, on related organizations, services, and to allow access to repositories of freeware, open source software products and tools useful for e-accessibility.

The initial vision was that of a single Portal evolving from the already-existing EASTIN system (European Assistive Technology Information Network) and including two major components: the ETNA information system – a search engine that aggregates information from various providers and repositories all over Europe and beyond, under responsibility of the ETNA network – and a virtual community connecting all stakeholders, under responsibility of ATIS4all, another Thematic Network belonging to the same cluster.

In the course of the projects the two components gradually took shape, thanks to the contributions of all partners within each network and the collaboration between the two networks. Eventually, technical and sustainability reasons suggested to rethink the initial vision and establish two distinct but coexisting Portals, instead of a single one, which will collaborate and communicate with each other at various levels: the ETNA information system and the ATIS4all collaborative portal.

In order to support the technical and contents development process, field tests have been carried out for the first release of the ETNA information system - whose development is responsibility of the ETNA Consortium - in order to assess its effectiveness in meeting all participants' information needs.

This work is executed within Work package 7 “Field tests, validation and launch” and consisted of two steps.

As a first step, a validation plan was established, defining the tools and the methods to be used in the field tests, and the way in which the results were going to be processed. This plan is reported in deliverable 7.1 (“plan for the validation of the TN portal”).

As a second step, field tests were carried out according to the instructions provided in deliverable 7.1. The results of the tests and the recommendations are reported in this deliverable.

The test activities were chiefly focused on the search interface, the data upload tool and the user rating and comments tool. These components of the ETNA information system are described in Deliverable D1.6 (“Search engine and interface 1st release”).

In the project DoW (Description of Work) the test/validation activities had been originally planned in the last semester of the project (months 31-36). However, in the First Year Project Review (March 28, 2012) it was recommended to bring them forward, so that more time would be available to implement changes to the portal, based on the findings of the field test.

In response to this recommendation, the ETNA Consortium decided to start preparation of the validation in September 2012, so as to be ready for the field-tests right after the first release of the ETNA Information System. This was launched in mid February 2013; the second release was scheduled in July 2013 but was actually launched at the beginning of September 2013; which means that the test activities were actually focused on the first release of the ETNA Information System.

The advantage is that the draft recommendations were available before the second release
and thus could be taken into account by the technical developers very soon. As a matter of fact, in order to avoid the risk that possible critical issues encountered in the course of testing activities are made known too late, in the course of the validation activities close interaction was kept with FDCGO (responsible for the technical development) so that the technical developers were able to promptly fix problems.

As the ETNA Information System has not been developed from scratch, but evolving from the already-existing EASTIN system, the testing/validation activities concentrated on the additional improvements introduced to the EASTIN system by the ETNA project, rather than on the facilities that have been inherited from the EASTIN system without modification. Indeed the latter had been extensively validated in 2005 within the previous eTEN EASTIN project.

This means that all test activities focussed on:

- **ICT product-related contents** rather than on assistive products in general
- **Extra resources** added to the already-existing EASTIN system, such as organisations (companies, projects, service providers) and additional information (ideas, literature etc.)
- Extra facilities, such as the *data upload tool* and the *user rating/comment tool*.

### Validated items

As decided at the workshop in Milano, February 2013, the items to be evaluated were:

- The **Web Portal** with information on ICT-based Assistive Technology products available in Europe, and related information such as organizations, projects, literature etc. Only contents related to ICT-based assistive technology would be evaluated, rather than all contents provided by the databases of the existing EASTIN network.
- The **Upload tool**, which gives to authorised organisations the opportunity to directly upload their information resources. The upload tool is part of the first release of the ETNA Information System; however, due to its different characteristics it was treated with specific methods and timing (it was necessary to upload information through the upload tool, before being able to evaluate its information contents).
- The **Rating and Comments tool**, which adds a novel type of information produced by end-users to the system: while using the database, end-users can rate products in the database based on their experience. This rating tool is a modification of the QUEST Instrument (Quebec User Evaluation of Satisfaction with Assistive Technology) (Demers et al, 2000). This tool is a new feature with specific characteristics, thus it had to be validated by means of specific methods.

### Overall research questions

The goal of the work described in this deliverable was to carry out field tests on the first release of the TN portal, in order to check the extent to which the ETNA Information System is actually usable by the intended target groups (stakeholders) of the ETNA project; end-users, professionals, suppliers, researchers, policy makers.

The following overall research question was formulated:
How adequate in use is the ETNA Information System for all kind of stakeholders? What is the opinion of the stakeholders about the usability of the database and how can it be improved?

As stated before, the items to be validated are the Web Portal, the Upload Tool and the Rating and Comments Tool. Therefore the overall research question was reformulated per items to be validated, which resulted in three research methods carried out separately for each of them.

- **Web Portal**: How adequate is the ETNA web portal in use for all kind of stakeholders; what is the opinion of all kind of stakeholders about the usability of the database and how can it be improved?

- **Upload tool**: How adequate is the upload tool in use for all users and how can it be improved?

- **Rating and Comments Tool**: Does the rating and comments tool work adequately for all kind of users, in the opinion of these users, and how can it be improved?

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1 A literature study was carried out to define the concepts of usability, suitable for the TN Portal. The concepts described by the ISO classification (1998) and Nielsen (1993) appeared to be the most appropriate. These concepts with variables and definitions are explained in deliverable 7.1. The concepts are: effectiveness, efficiency, learnability, memorability, errors and satisfaction.
Results

In this chapter the details of the data collection, the data analysis, the population and the findings are described for each item to be validated. For the Web Portal the methods used were:

- an expert review (heuristic evaluation)
- the co-discovery learning method, and
- the PSSUQ (Post-Study System Usability Questionnaire).

For the Upload Tool and the Rating and Comments tool, an online questionnaire was used.

Details on the motivation for the methods described are explained in deliverable 7.1.

Web Portal

Data collection, participants and data analysis

The collection of data was done using three different instruments, as recommended in D7.1.

First, a heuristic evaluation was executed by three experts from three different countries: Greece, Denmark and Germany. The experts were selected and recruited by the partners from respectively CERTH (Greece), the National Board of Social Services (Socialstyrelsen, Denmark), and the Forschungsinstitut Technologie und Behinderung, (Germany). They are all experts in ICT and are familiar with databases on assistive technology and with the English language as well. The Heuristic Evaluation checklist in English was sent and returned by email.

Second, the task-oriented co-discovery method was executed, followed by the Post-Study System Usability Questionnaire (PSSUQ). The participants were recruited by the partners from respectively Zuyd Hogeschool (The Netherlands), DLF (UK), TECNALIA (Spain) and AIAS (Italy), using their Institutional network and considering the types of stakeholders (as defined in Deliverable 2.2) and the inclusion criteria as formulated in D7.1. The instruction manual in English was sent by email. Each partner translated parts of the instruction and questionnaire into the Dutch, Spanish and Italian as needed. Clarifications about language issues were discussed by email before translating in the native language.

The task oriented co-discovery method consisted of an informed consent, a pre-test questionnaire (characteristics of the participants), the co-discovery questions (to be used during the performance), a task instruction plan (for the observant), with a description of 16 tasks for the end-users and 8 additional tasks for all other stakeholders. The tasks included finding ICT-AT resources (as defined in Deliverable 3.2) by using all the modalities present in the system, i.e. different ways of searching and searching for different resources. Furthermore, the method included an observation list (for the observant to register i.e. facial expression or completion of the task), and instructions for registration of top findings (the most positive and negative experienced during the testing). Finally, the participants answered the PSSUQ questions. The management team decided to avoid video recording the sessions as anticipated in D7.1, because of the time consuming task of translating the different languages to analyse the data. Furthermore,
video recording would not provide additional valuable information in addition to the already extended evaluation.

Mostly the co-discovery learning method was executed with two participants of the same type. When necessary, the observer/researcher would act as the second co-discovery partner. In two cases, the different types of stakeholders were combined.

The Dutch evaluations were performed based on the Belgian keywords list, because at that point in time the Dutch national database wasn’t connected to EASTIN system yet. Likewise, the Spanish evaluations were performed in English language on the basis of the UK database, because also the Spanish database wasn’t connected yet; therefore, only English speaking Spanish participants were included.

Data were made anonymous, were translated/digitalized per each country, and were sent to Zuyd Hogeschool. Clarifications related to unclear data were asked and discussed by email.

The questions of the heuristic evaluation were ordered and analysed using the headings of the evaluation (such as the layout, the interface/technique and error messages) and subheadings (such as visibility of system status, match between system and real world, user control and freedom, consistency and standards, help users recognize etc.). In addition to that, the browser version was registered. The remarks of the experts were listed, counted and coded.

Data collected through the co-discovery method and the PSSUQ were structured and analysed using Microsoft Excel. All data was labelled and coded systematically according to the different parts such as the pre-test questionnaire, the co-discovery questions, the tasks, the observation list, the opinions expressed in the top findings, and the PSSUQ. From the overview of information, relevant outcomes were extracted and data was compared. Outstanding information and differences among the types of stakeholders and countries were reported. Eventually a list of recommendations was made according to the same structure as the analysis of the results.

In this section the findings are described in the following order:

- heuristics (layout, interface/technique and error messages)
- co-discovery (characteristics of participants, performance of the co-discovery tasks per task, top findings) and the PSSUQ.

**Heuristics**

**Layout**

**Positive comments**

Every expert mentioned that there is good visual feedback in menus or dialogue boxes about the cursors options, the selectable choices and to selected and/or moved objects. Pages were clearly labelled to show relations to others on multipage menus. There are up to four additional colours for occasional use only. There is a good colour- and brightness contrast between image and background colours. Colour coding is consistent throughout the system and used in conjunction with some other redundant cues. High-value, high-chromatic spectrum colours are used to attract attention, especially on input-error-messages. Light, bright, saturated colours are used to emphasize data and darker, duller, and de-saturated colours to de-emphasize data. GUI menus are offered to make it obvious where selection is possible. Industry or company formatting standards are followed consistently in all screens throughout the system. Furthermore, the size and font are enlargeable. Size, boldface, underlining, colour, shading, and/or typography are used to show relative quantity or importance of different screen items.
Comments related to the **layout in general** were that white space is used to create symmetry and leads the eye to the appropriate direction. In addition, the text areas have ‘breathing space’ around them. Items are grouped into logical zones using distinct and adequate headings. They are mostly not more than twelve to fourteen characters wide and six to seven lines high. Uncommon letter sequences are avoided whenever possible. The visual presentation’s layout is well designed. The colours and uppercase letters are used with discretion, so that the focus stays on the information. Menu titles are well orientated, either centred or left justified so they are properly noticed.

The **menu choices** are ordered logically into categories and understandable. Each lower-level menu choice is associated with only one higher-level menu. In addition, the menu structure matches with the task structure, so an easy overview about all the features of the database is given. There are salient visual cues to identify the active window. Each window has a short, simple, clear and distinctive **title**. Field labels are brief, familiar, and descriptive. **Icons** are understandable, clearly constructed and highlighted when surrounded by non-selected icons. Excessive detail in icon design is avoided. Data entry screens and tasks are described in user-friendly **terminology**. **Information** is accurate, complete, relevant goal-oriented, descriptive procedural and understandable.

Prompts, cues, and **messages** are well located on the screen. **Prompts** are expressed affirmative and are written in an active voice. The command language uses user-friendly language and avoids computer jargon. The system provides **mapping** including a clearly arranged site. **Navigation** works properly. The structure of **data entry** value is consistent from screen to screen. Frequently confused data pairs have been eliminated whenever possible.

**Negative comments**

The **heading** ‘Organisations’ does not describe the content adequately. The heading ‘Search for Companies’ is suggested. Not all the terminology used in menus is translated in the chosen language. No consistent **category design scheme and style** is used for the following categories: “Searches → Assistive Products → Guided search, the results screen, what is EASTIN, the EASTIN partners, general info (black on white)”. The same colours and background should be used for all features. The ‘**Review this product button**’ is orange coloured, which does not fit the overall colour scheme. There are no symbols used to break long input strings into ‘chunks’ so that users can easily orientate themselves. The experts did not agree on whether the icons are a harmonious member of a family of icons.

**Menu instructions prompts and error messages** appeared in the same places, but searching with ‘Advanced search’ and filling in wrong ISO-Codes, do not lead to a hint or message. Also all input fields are deleted, which means that there is no information for the user. On ‘submitted and on-going search’, there is no **system feedback**. It is suggested that the search-button should change colour or something else should indicate the busy-state.

The first word of each **menu** choice is not the most important one, this leads to confusion for the users. Users have no access to an online spatial menu map at **menu levels**. More than seven colours are used, which are far apart along the visible spectrum. Extreme colours must be avoided. Long columnar fields have to be broken down into groups of five and separated by a white line. There is no good contrast between different colours. The experts did not agree about whether colour is used specifically to draw attention, communicate organization, indicate status changes, and establish relationships. Most zones are no more than twelve to fourteen characters wide and six to seven lines high, except ‘supplier information’, which has 19 characters.
Critical comments about the usability are that function keys are not arranged in logical groups, they do not exist. Furthermore the users cannot define their own synonyms for these commands. The system does not allow novice users to enter a simple command, nor allows expert users to add parameters. Optional data entry fields are not clearly marked. Data entry screens and dialog boxes do not indicate when fields are optional, which might lead to confusion of the users.

Interface/technique

Positive comments

The language of the given data codes is distinctive. Users can choose between iconic and text display of information. All icons are visually and conceptually distinctive in a set. Each icon stands out from its background. Regarding the usability of the database, the response time is appropriate to the task. There is no high level of concentration and information needed using the database. There is no need to remember information more than 2-15 seconds. Users can reduce data entry time by copying and modifying existing data. Users are the initiators of actions rather than the responders. Scrolling and moving the cursor to the next or previous field is consistent throughout the system. Furthermore, vertical and horizontal scrolling is possible in each window if necessary. The option to enter multiple commands in a single string exists. The system also provides function keys for high-frequency commands. There are pop-up or pull-down menus within data entry fields, which have many, but well-defined, entry options (e.g. country-selection-field). On menus, users have the option of either clicking directly on a menu item or using a keyboard shortcut. The system uses a standard graphic user interface (GUI) so the menu sequence is already specified. Menus adhere to the specification whenever possible. If the database includes groups of data, users are able to enter more than one group on a single screen. If menu list is short (seven items or fewer), users can select an item by moving the cursor and if they are long (more than seven items), users can select an item either by moving the cursor or by typing a mnemonic code. Window operations are easy to learn and use. The system offers ‘find next’ and ‘find previous’ shortcuts for database searches. When users attempted entering a screen or dialog box, the cursor is already positioned in the most likely needed field. The method for moving the cursor to the next or previous field is simple and visible, by tab (function key), but it is difficult if the tab is not known. The most important information is placed at the beginning of the prompt. All the data needed is shown on the display at each step of a transaction sequence. User actions and system actions are named consistently across all prompts in the system. Character edits are allowed in data entry fields and finally data inputs are case-blind whenever possible.

Negative comments

Field labels appear to the left of single fields and above list fields in data entry forms, but not in search forms. No dots or underscores are used to indicate a field’s length. Field-level prompts provide more information than a restatement of the field name. GUI menus make it obvious which item to be selected and whether reselection is possible, but: “it depends on the user's literacy to use them, if checkboxes are known”. Menus are broad rather than deep and if the system had multiple menu levels, there should be a mechanism that allows users to go back to previous menus and to change their earlier choices. The menu choice’s name on a higher-level menu is used as the menu’s title of the lower-level menu. Prompts imply a necessary action and the words are consistent, but while submitting a product, clicking on the flag of the EASTIN countries (where the product is available) does not work. Abbreviations do not include punctuation, and they differ in product- and company names. The system translates data for users, but when changing
the language, the user is forced to start searching from scratch. The disclaimer, the accessibility and some parts of the sitemap are not translated.

If the system had multipage data entry screens, users could move back and forward among all pages in the set, but only if the previous page is correct. Input data codes are meaningful, except for the ISO-Codes. For question and answer interfaces, the valid inputs for a question are not listed. Data entry screens and dialog boxes do not indicate the number of character spaces in an obvious way. A question and answer interface to type some requirements does not exist.

If users have to navigate between multiple screens, the system uses context labels, menu maps, and ‘bread crumbs’ as navigational aids, but there is no back icon or instructions for going back one step. Users cannot type-ahead in a system with many nested menus and they are not prompted to confirm commands that have drastic, destructive consequences. A system to navigate between multiple windows does not exist. The system also does not interpret variations in user commands in a smart manner. It does not colour-code items automatically with little or no user effort. Users cannot turn off the automatic colour coding if necessary. There is an ‘undo’ function at the level of a single action, a data entry, and a complete group of actions. Users can cancel operations in progress but they cannot set their own system, session, file, and screen defaults. Furthermore, it is possible that the users can reverse their actions easily, but this always depends on the action, for example ‘searching a product’ works, ‘submitting a product’ does not. One expert mentioned that very soft tones should be used for regular positive feedback and harsh tones for rare critical conditions. Both are not available but necessary for blind people. A help function does not exist (for example a key labelled ‘Help’ or a special menu). It is also not easy to access and return from the help system. Furthermore, no memory aids exist for commands, either through online quick reference or by prompting.

**Error Messages**

**Positive comments**

Prompts are brief and unambiguous. They are worded so that the system, not the user, ‘takes the blame’. Messages put users in control of the system and avoid the use of exclamation points. They avoid the use of violent or hostile words and avoid an condescending tone. Furthermore, they provide appropriate semantic and syntactic information. These messages indicate what action the user needs to take to correct the error and prompts are stated constructively, without overt or implied criticism of the user. Sound is not used to signal an error. If an error is detected in a data entry field, the system does not put the cursor in the concerning field nor is the error highlighted. Error messages were grammatically correct, ‘but in Danish screens some text still is in English, and not all Danish grammar is correct’. This problem also occurs in other languages.

**Negative comments**

All error messages in the system use consistent grammatical style, form, terminology, and abbreviations, but “some translated text needs to be looked at”. The experts did not agree on the content of the error messages, how to inform the user about the error’s severity. If the system supports both novice and expert users, there are no multiple levels of error-message details available. When menu choices were ambiguous, the system does not provide additional explanation when selecting an item. The system does not prevent users from making (serious) errors. In addition, attention-catching techniques are used scarcely so that messages were unobtrusively for users. Memory aids for commands do not exist, no online quick reference nor prompting.
Co-discovery method

Characteristics of participants

The overview of participants is shown in Table 1. Nine researchers/developers, five policymakers, two suppliers, seven professionals and thirteen end users participated. Five end users are limited in motor function, two have visual limitations, two are blind, one is cognitively limited and three were caregivers.

In relation to computer skills, 41% of the participants considered themselves proficient users, followed by 23% experienced users. 18% thought of themselves as competent users, only 6% thought they were experts. 12% reported they were beginners. Most participants used all kinds of devices like a laptop, a desktop PC, a tablet and a smart phone. End users showed the lowest percentages on laptop and smart phone usage, respectively 57% and 43%, compared to the other user types (researchers, professionals, policymakers and suppliers). Also Spanish and Italian participant appeared to use fewer tablets (25%), compared to the Netherlands (50%) and the UK (60%). 47% of all participants work more than 6 hours on a computer of which 20% is spent on surfing on the internet. The application types used are very diverse. Prominent is the low usage of word processing and surfing among end users, compared to the other types of users.

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Table 1 - Overview of respondents

Performance of the co-discovery tasks

General

The majority (56% of all participants) was able to start the system independently. In other cases (20%) the system was already started by the observant. All others (24%) needed help to start the system. The average time to perform the tasks was less than one hour (62%). 24% of all participants needed 1 hour to 90 minutes, 14% needed more time. There was no significant difference concerning types of participants or between single countries.

In 56% of all tasks, errors were made. 65% of all participants were able to recover from the error. End users needed more help (50%) than other types of users (14%) from the observant to recover from errors. There were no significant differences found between single countries. Using the system did not lead to a stressed mind or frustration in general. The participants of the Netherlands show lower scores (41%) in solving the tasks in general, than the participants in the other countries (69%). The Netherlands included the most end users (table 1).

Per task
“Per task” describes how many participants performed the tasks. Those who did not solve the task either got help from the observant or the co discovery partner, or did not solve the task. Figure 1 gives an overview of the percentage solved per task.

The first task was to search products by ISO codes. 71% of all participants solved the task. All participants in Italy and the UK solved the task. Only 24% of the end users solved the task, compared to 70% of the other participants. Those who did not solve the task by themselves said the task was difficult because of the fact that they were not familiar with ISO codes. Three of them stated not to use search by ISO at all. One Italian policymaker indicated that the list of ISO codes was very long.

The second task was to search products by keywords. 59% of all participants solved the task. Twelve participants mentioned that the search terms were not described specifically enough. Ten gave the comment that the keywords were not translated into the chosen language. Moreover, eight people indicated that there was no possibility to formulate your own search terms. Six participants thought that the list of keywords was too long, not easy in use and did not work well. Five participants stated that searching by keywords was quite difficult. Two people stated that searching by the search field works, but the cursor does not change, so it is not clear whether this is a button. According to one participant it was very time-consuming. One person stated that different keywords existed with the same tendency.

In general, searching by commercial name was found easy to perform and a useful search module. 85% of all participants solved the task. No comments were given. Searching by manufacturers’ name, was solved by 76% of the participants. In general, participants thought it was an easy task. One person from Spain who did not solve the task, found the manufacturers name under ‘organizations’, with help from the researcher.

Searching by insert date was the fifth task. 75% of all participants were able to solve the task. In general this task was easy to perform and found useful, especially to be able to find the newest updates. Three people found the terms ‘ascendant’ and ‘descendant’
confusing and one person stated that these terms made searching easier.

The sixth task was to search by **search field**. 54% of all participants solved the task. In Italy Spain and the UK all people were able to find the search field. This task could not be performed by the Netherlands due to technical reasons. This caused some irritation in the participants. When searching the search field using English words, people in the Netherlands could also solve the task. Because of this, eight people indicated this problem. By changing the language to ‘English, United Kingdom’, the Dutch people were also able to use this button and all were able to solve the task. A comment was, when getting results, this was not shown in the right order; for example; the rated ‘product groups’, which came first, were not as relevant as the ‘products’ themselves and the ‘manufacturers’.

Task seven was searching by **company names**. 64% of all participants were able to solve this task. No problems occurred while performing this task in Italy and the UK. There were no further comments given about this option.

The eighth task was to search for **associated information**, like a case study. 56% of all participants were able to find the information.

One person mentioned that this possibility of searching was very impressive, but searching for case studies by using ISO/ICF codes did not work, because these codes are not described specifically enough. While looking for a ‘case study’, it might be more useful to be able to look for ‘title’ instead of searching by ‘keyword search’. A recommendation, given by one user, was to change ‘associated information’ into ‘user information’.

The following task was to find the possibility to **write an e-mail to an organization** (info request). 78% of all participants were able to find this option. One person mentioned that it was suggested to use: ‘organization to contact’. Also two people stated that there was no possibility to get more information about specific organizations and to contact them. Two people mentioned that there was no explanation about e-mail-contact: “Who is getting contacted? What questions are answered here?” It would be better to be able to choose a company to send the e-mail to. One user stated: “instead of using the term ‘Information’ in regard to the function of writing an e-mail, the term ‘Organization’ would be better.” Another user suggested changing the term ‘information’ into ‘request information’. The send button should be located at the right side and should be better readable.”

The following tasks were only performed by professionals, suppliers/manufactures, researchers, and policymakers (N=21).

The first task was to **get in contact with other database users**. 47% of the participants were able to solve this task. The general statement was that the task was quite difficult. The term ‘forum’ did not fit in the category ‘associated information’, a category like ‘contact’ would have been useful, according to two participants.

The second task was about finding the **newest developments**. 61% of the participants were able to finalize this task. There were no further comments.

Task three was to search for **suppliers**. 55% of the participants were able to solve this task. Some participants were irritated and found this task quite difficult. A general positive remark was that there are many addresses of suppliers available. Four people stated that some suppliers and manufacturers did not have the right description. Furthermore one person mentioned that there were no hyperlinks to contact manufactures and suppliers. Hyperlinks should also be named in descriptions.

The following task was to find **reviews of other users**. 94% of the participants were able to find reviews of other users. One person found this option good and helpful. Two people indicated reviews of other users were not easy to find. Four people were confused that
they were linked to the ATIS4all website without any clear reason or explanation. Two persons found the ‘ratings’ button was too unobtrusive.

The fifth task was to find relevant literature. 89% of the participants finalized this task successfully. It was stated that the way of searching literature was clear. Three people missed the possibility to organize the literature they found. Moreover, two people found that while looking for articles, no further search refinement possibilities existed. Two people said that the system was slow, especially when looking for literature. One recommendation was to have ‘literature’ better under ‘information’”, instead of ‘associated information’.

The final task of the performance was to look for new resources. 78% of the participants were able to complete the task. Participants thought the ‘new resources’ function a good operational option. One person reported that this search was not clear. Participants found that “the category ‘associated information’ did not fit with ‘searching for new resources.”

After performing the tasks the participants were asked for their opinion in general about usability of the system. The remarks were summarized and categorized and the results are shown later on.

Layout

General comments of the participants about the layout of the ETNA database were that information was easy to read because of the adequate size of letters, but there was no consent about the structure of the database. Some people stated that the database was structured and arranged clearly. Others considered that the entire database-system was not clearly structured, was difficult to use and was overall not attractive. Also the layout was not usable for users with visual problems. There was not enough contrast in colors of the text in relation to the background. Moreover, the presentation of products and information was not logically organized, in the opinion of the participants.

Technical issues

Overall, it was stated that the ETNA information system operated solidly, but it does not show the number of pages while searching. In this case the option ‘searching by alphabet’ was more practicable than ‘searching by page numbers’.

One blind participants said he couldn’t use any part of the database. However, other blind participants stated they had no problem with screen-reader software like Jaws.

Search functions

In general, the search function was good, because of the various ways of searching for a product. “But watch for too many various possibilities while this could lead to confusion, because people do not know where to search.” Search by the category ‘assistive products’ was considered clear and logical. The easiest way to find information was to look for a specific product. Also, finding products worked well with detailed searches. However it was not possible to search by problems/disabilities and not all search options were available for each category. A recommendation, to make this option more useful was to make use of general search-buttons within each category. Furthermore, it would be convenient if there were a search-function to look for contents/topics and not only for ‘title’. Finally, ‘advanced search’ should be incorporated under all research strategies.

Categories/Terms

With regard to this topic, there were only negative comments given. First, some
headings/categories were not clearly described (e.g. associated information) and these categories were not filled adequately. Second, the used terms while searching should be described particularly. Further, a better distinction between the two menu-bars at the top would be useful, because the difference between the general menu about ETNA and the menu choices of searching was not arranged clearly: “Within the category ‘assistive products’, a ‘review’ button should be created. Also the button ‘documents’ should be ‘documents about us’, because it was not clear which documents can be found here”.

**Information**

Regarding the products, a lot of information was available. The product's prices on the other hand were not shown though this would be helpful information, especially for professionals. Further, the product's pictures were of a low quality, so that the product could not be identified clearly. Some users stated that more information regarding aids was expected.

**Languages**

The functionality of choosing different languages did not work well, yet. Not all possibilities were available in various languages, especially the general ‘search-button’. It was confusing to have different pages for each product within different languages. Changing languages within the searching process implied that each time the user had to start at the very beginning of the search. This might lead to frustration and dissatisfaction.

**General**

General comments about the database were that it delivered a lot of opportunities and it could become a nearly perfect tool if everything worked well and if it was up to date. A frequent statement was that ‘the more they were making use of the system the better it worked after a while’. It was very much appreciated that EASTIN took this initiative to create an international database for ICT related products. Unfortunately, there were still aspects which did not work well. People had to become familiar with the website. This was quite difficult in the beginning. Some people questioned if this project was really necessary and if it had delivered an added value with regard to the already existing databases or Google.

**PSSUQ**

Satisfaction about the performance of the system was measured by using the PSSUQ (Figure 2). The PSSUQ contains 19 statements about satisfaction. Answers are possible in a range from 1 (strongly agree) to 7 (strongly disagree).

In general, the participants’ answers were neutral. The variance is between 2.6 and 4.3, which means that they overall tend to agree a little with the statements. There is no significant difference between the stakeholder groups or between different countries. Some striking data are mentioned.

In question 9, ‘the system gave me error messages that clearly told me how to fix problems’, all stakeholder groups showed a lower score and the Netherlands scored the lowest (1.9), compared to the scores of other questions and compared to the other countries. This means that the participants agree more with this statement in comparison with all other statements.

In question 13, ‘The information provided by the system was easy to understand’, the
professionals agreed more (2.7) with the statement that other stakeholder groups (3.5).

In questions 16, ‘the interface of this system was pleasant’, the suppliers’ disagreed (5.5) while the other participants' answers were neutral (4.0).

End users disagreed (4.8) with the statement (question 17): ‘I liked using the system’, while other participants slightly agreed (3.6).

Suppliers disagreed (5.0) with the statement (question 18): ‘This system has all the functions and capabilities I expect it to have’, while the other slightly agreed (3.3).

In question 19 end users disagreed (4.8) with the statement: ‘Overall, I’m satisfied with this system’, while the other participants slightly agreed (3.6).

Figure 2 - Overview of the PSSUQ questionnaire results

Upload Tool

Data collection, data analysis and participants

The collection of data is done by using an online questionnaire, as recommended in D7.1. The upload tool was evaluated by 21 out of 23 partners of the ETNA project. Each partner of the ETNA-consortium was asked to upload one ICT Assistive Product, one ICT resource in the ‘Organizations’ section and one ICT resource in the ‘Associated Information’ section. The partners received an instruction with screenshots by email. After that, the partners were asked to fill in the online questionnaire, which consisted of 53 questions based on the instruction of the using the upload tool. Question types were open ended, closed and multiple choice. The answers were organized and analyzed by using Microsoft Excel. Each category was marked with a color. Answers to open questions were coded and merged when possible.

Findings

In general, the participants described the upload-tool as easy and useable. In addition, many recommendations and remarks were given as described below.
**General**

- It was not comfortable in use (for example the ISO code selection for new products: the selection of primary and secondary features is not presented very clearly)
- Regarding uploading assistive products and related manufactures and suppliers, the system worked well. It did not work well regarding uploading an organisation.
- It was unsatisfactory for associated information, such as general publications.
- Accessibility features of mainstream products were not handled well.
- It would be helpful to provide a system of making the long lists of associated codes easier to navigate.
- The layout was “very dark”. The given recommendation was to make use of different colours regarding the different categories “to differentiate and highlight more clearly the different functionalities offered to the user.”
- “It requires a change in accessibility, giving the possibility of changing colour fonts and colour background.”
- “A spell checker would be good.”
- “Filling in the features of the product is quite laborious; I wonder how well these will be filled in.”
- “Huge long list of uncategorized ISO codes (Product Detail 2) is hard to navigate.”
- “It would be good if data didn’t got lost if page is accidentally navigated away from” (e.g. through poor internet connectivity or other facts)

**Overall judgment**

Participants were asked to give an overall rating on satisfaction with the upload tool, on a scale from 1 to 10, in which 1 is very bad and 10 is excellent. As shown in Figure 3, most participants rated a 7, in a range from 5 to 9, which is very satisfactory.

![Figure 3 - Overall judgment of the upload tool](image)

**Assistive products**

Regarding the process of uploading assistive products, by filling in the ‘product name’, 85% of the participants did not have any problems. However, “an example of how to fill in this field would be very helpful.”

40% of the participants were negative about filling in the ‘manufactures name’: “Terms are not clear”, “when a manufacturer did not exist, I have to go back to create it first.” The participants had already filled-in several aspects before the system indicated that this manufacturer was not connected to the ETNA database, yet. First, they had to connect the
manufacturers' name to the site, before they were able to upload.

In relation to choosing an ‘ISO code’, while uploading an assistive product, 30% of the participants indicated that the list of the ISO codes was too long. It was also difficult to navigate in this list: not only a primary ISO code had to be chosen, but also a secondary ISO code as well. This secondary ISO code could be multi-interpreted according to the participants. Nevertheless more than 50% used ‘selecting further optional ISO codes’. In comparison to the way of choosing first ISO codes while uploading organisations, the given list of optional secondary ISO codes was more practicable.

A suggestion to solve the problem of the ambiguous way of understanding the secondary ISO code was explaining when this option could be useful. The same occurred while using ‘expand secondary features’. A solution might be to give instructions about the way of using this function within the upload-tool. In general, participants were positive about this option. Some comments: “there is enough guidance” and “It is generally friendly and easy to use”. Finally, the following remarks about uploading an assistive product: "It should be explained, that the term ‘description in original language’ means the language of the person who is filling in the information" and "The name of the category ‘assistive product’ was not clear, because of the fact that not a product was uploaded but information about this product”.

**Organizations**

The most uploaded feature in the category ‘organizations’, was companies (57%), followed by service providers (24%) and projects (19%) as shown in Figure 4.

![Figure 4 - Which categories did you upload?](image)

Three participants did not find it necessary to translate the organisation name in English and to fill it in several times. Comments about filling in a ‘full name’, ‘full name in English’ and ‘short name’:

- Instead of ‘full name’, ‘full name in original language’ should be asked.
- Name of organisation should not be translated.

Two participants were positive about filling in a ‘start date’. One said, “It is important to know how long an organisation has been on the market.” Another stated, “even if the start and end date are often not clear, this information is useful. Other participants mentioned that it was not always possible to fill in a ‘start date’, because some companies
did not even have a defined start date. Eight out of 16 participants said that it was “not necessary for companies or organisations, but surely necessary for projects.” It was also said that the term ‘start date’ was not clear. “The start date should not be mandatory.”

![Figure 5 - Which non-obligatory items did you upload?](image)

Regarding the question “which of the non-obligatory items named below did you upload”, the following answers were given (Figure 5). In this table, it is visible that all items were uploaded, except for a ‘Skype Account’.

With regard to the ICF codes it was mentioned that a “help button with short information and links to further information may be useful.” A general comment about uploading an organisation was that it “goes quite smoothly” but that there were “just many things to click and to fill out.” A recommendation by the participants was that “many organisations cover ‘all disabilities’ or ‘all relevant disabilities’ - a selection for this would be useful.”

**Associated information**

Most uploaded aspects were articles and forums (Figure 6). The opinion about filling in associated information was that ‘author’ should not be mandatory, also the space to write was too short and the “language should be marked with a ‘*’ as it is an obligatory field.”

With regard to the ISO codes on uploading associated information, 75% of the participants found the ISO codes clearly described. A further comment was that “filling in ICF codes was not relevant for ‘forum’ type of information”.

A general comment about uploading associated information was that 500 characters for the description were not enough. In addition, the options to fill in ‘not applicable’, ‘don’t know’ or ‘none of the above, should be possible.
Error messages

General comments about ‘error messages’ were that they were not clearly described. “The message told where the error was, but not what was actually wrong.” In addition, “the error text was written by field but not highlighted in the options which had to be filled in”.

Help function

The participants (10%) did not often use the help button. Some comments: “Help should be provided as online help, or alternatively be opened in a new browser tab or window”. “If I click on the Help tab (or any other tab) during the entry process I am thrown out of it without warning and losing the entered and not saved information. This is not very nice! You should be prompted and warned about this, with a chance to complete and save before leaving - if possible. Another comment was that “it contains information on the measurements syntax only. More information on other items is needed.”

Description of the modifying and the deleting process

Almost all participants found the modifying process was clearly described. One participant stated, “The process was well described but when you modify an item of the first page in the data sheet, you need to press ‘next’ many times going through all pages. We would like to have a button in every page to ‘finalize’.”

Almost all participants found the deleting process described clearly. Only one remark was made: “When I checked it last time, there wasn’t even an additional warning: Pushing ‘delete’ will erase this product from this database”.

Rating and Comment Tool

Data collection, data analysis and participants

The data collection was done by using an online questionnaire, as recommended in D7.1. The rating and comments tool was evaluated by 18 of 23 partners of the ETNA project.
The participants had to be able to understand and speak English. Each partner of the ETNA-consortium was asked to rate a product, using the instruction manual with screenshots sent by email. After that, the participants were asked to fill in the online questionnaire, which includes 27 questions about their experiences, opinions and satisfaction about the rating and comments tool. The answers were organized and analyzed by using Microsoft Excel. Each category was marked with a color code. Answers to open questions were coded and merged when possible. In the next section the findings are explained per category.

Figure 7 - Judgment of the rating and comment tool

Findings

General

All participants were overall satisfied with the rating and comment tool. As shown in Figure 7, most of the participants gave an average score of 6.8 out of 10 points. Positive statements, for example, were that the layout is fine. Some people mentioned that it is a good idea to show all questions on one page, so the user may see that it does not take too much time to fill in this rating. Participants stated that “It was easy to fill in this rating and comments tool”, “It was good to know what other users think about a product” but also: “the graphical design is not attractive at this moment and needs to be improved. But now the contents should become priority” and “maybe the multiple choice questionnaire could be re-designed in the future.” The last comment in general was about the way of questioning. The partner suggested, “Ideally it would be better to have the non-applicable questions removed for software products, because it is a problem that a rating system of one size fits all (for both hardware and software AT)”.

Visibility rating button

Starting with rating a product, the majority of participants mentioned that the rating button is easy to find. They also found the given instruction clear. One partner commented, “It would be beneficial to position the button closer to the name of the product”. The second recommendation given was that the “words on the rating button are not easy to read as it is white on orange and the font is hard to read”. Another participant mentioned that he had to “scroll down” to find the button and the term ‘review’ a product is not clear for any user. It is a more technical term. A description about: ‘Give your opinion about this product should help to understand’.
**ATIS4all redirection**

The logging in at the ATIS4all-website while rating a product led to confusion by more than 50% of the participants. “It can be easy to get lost, the first impression the user gets is to have clicked on the “wrong” link”.

Participants mention that “It would be good to find a brief note saying ‘to rate the AT product you selected, please log-in below’. They missed information about being redirected to another website with another layout. “A clear explanation should be included. Like a welcome text explaining why we are on a different website and what the relation between both networks is.” One participant “would leave ’logging in’ out. It makes things complicated”. One mentioned, “Any confirmation about being logged in, e.g. outlining the username was missing”. Another one stated that “it’s not clear how to log in: the registration button is located in a corner at the top of the page, not very visible”. Another partner indicated that “The log-in form was clear and reflecting the standard format. I would however explain to the user (e.g. adding a short note) that log-in is necessary to access and use ratings and other community services.” Another one missed the ‘forgot my password’-button. Further given recommendations were that there should be more space to fill in login-name and password. One partner commented that the website’s design should be clearer. 28% of the participants were positive about the process of being sent to the ATIS4all website.

**Instructions**

All participants mentioned that the given instructions on how to use the rating and comments tool were clear, and no further comments were given.

**Layout**

The layout was fine according to two participants. One mentioned that there should be a function “to scroll down automatically, now you have to scroll the page by yourself”. Further recommendations given were that the columns should be of the same size. Another comment is:”the font should be bigger, because now it is hard to read and not appealing”. One participant stated, “I’m not sure about the three columns; I think that there are too many and not good on smaller screens.” One participant indicated that “while working with Internet Explorer 9 all questions overlap on top of each question”.

**Free text comment**

All participants found the ‘free text comment’ helpful, useful, and very important “to collect also additional insights from the different users.” Two participants thought that it added new information about the product. It was “necessary to receive personal comments about the use and the opinions of the users that are not included in the questions. More details about the use of the product can be added in free text.” Another comment was that this function was also “helpful for manufacturers/developers for newer versions/releases of the product/software”. To make this opportunity more useful for every user, a participant commented that an instruction should be given here to mention that the information should be as concise as possible.

**Missing aspects**

It should be possible to be able to give the opinion about all aspects of the rating and comments tool. One participant mentioned that price, reliability and functional practicability are missing and “more ICT-like questions about whether the product worked fine on a computer or system used”. Two other participants remarked that “questions concerning software are missing such as: - Content related (e.g. is the
information the user retrieves sufficient?) - User Interface (e.g. colours, layout). It's probably too "hardware orientated" - User Interaction (e.g. intuitiveness)”. One partner would like some information about the “Satisfaction with the technical support or technical assistance. ‘Help’ after buying the product or that any other comment can be included in the free text space.”

Review this product

Everybody mentioned that the given ‘review this product’-information was clearly described. Comments about the given information were: “there are too many possibilities (e.g. ‘quite’, ‘more or less’, not very satisfied’). Therefore, there will not be an objective comparison in the end. It would be better to have just three categories: very, more or less, and not satisfied and of course, not applicable or no opinion”. ‘Not applicable’ should not correspond with a low rating. Very high or very low ratings should be justified necessarily.” “Different aspects will be rated differently depending on the application to which the device is being used. For some devices, there is only one application, but for others there could be numerous very different applications.” “At first glance, I was not able to find ‘read existing reviews’ - only after checking the instruction again. Perhaps it would be a good idea to position the link (maybe also in "button" form) directly UNDER the "Review this product" button”. “The English is a bit weird - needs to be checked by a native speaker”. “At the end of the rating process, the system notifies that the review is completed and registered. It also suggests to ‘Returning to the product description page’ that I found very useful. On the contrary, I find not very clear and difficult to locate the link to ‘Read the reviews for this product’ (I would not expect to find it below the title, but more ‘close’ to the button ‘Review’.”

Comments by other users

The participants thought that comments of other users were clear, informative, and readable. “Graphs are clearly represented and explained. However, I find difficult to relate the results to the review as different criteria are used, results are returned using ‘stars’, while the review is done using multiple choice questions.” One participant thought that the graphs were “kind of misleading”.

Interface

Regarding the interface, the following comments were given:

- “I think that the structure is quite complicated (Matrix-Layout). Partially sighted persons could easily get lost in this structure, also because the font is hard to read. A simple, top-bottom structure, placing every question under the other to give a clear sequence, should be useful.”
- “The products name and picture should be on the review listing and review details pages to make it clear what is being referred to.”
- “I think we need to be aware of the fact that the results of the rating and comments tool will not be objective and would need someone to act as a gatekeeper to see what is included in the statistics, to make sure that no one may falsify the results.”
- “When finishing the rating, a text field appears with the following description: ‘Ratings your ratings have been saved. Return to the product description page’. This sentence is not correct. It is not clear that the button ‘Reviews for this product’ means to read other users’ ratings.”
- “There is no ‘return’ or ‘back’ option when you go to the ’Review detail’ of one of
the reviews of a product. No option to return to the reviews list.”

**Buttons in general**

The buttons were clear and the right format according to the majority of the participants. However, there were some recommendations. For example “‘See all’ could be ‘view full reviews’”. “The buttons’ layout was unsuitable; the text was hard to read.” In addition: “The save-button could be more obvious, because there is no way back from the review details-page other than the browsers back button.” Furthermore, it is mentioned that the meaning of, “the button ‘see statistics in more detail’ is not clear. The result is that the number of reviews and the average rating are presented by type of reviewer.”

**Added value**

80% of all participants were positive about the added value of the tool. They found it useful, helpful, and an (added) value. The information other users gave was important for users of the product.

Recommendations given: “there should be a minimum of ratings achieved before releasing the ratings to the public”. “A gate keeping function would be helpful, to make sure there is no misuse of the rating and comments tool.” One participant was not sure whether the rating and comments tool gave enough helpful information. Adding case descriptions and free comments could also give useful information. “Any kind of user report would be more useful than a false rating.” Another comment was that it should not be possible to give several ratings from the same IP-address. “In conclusion it may be said that the rating and comments tool is a good opportunity, but it would be much more useful if all the recommendations were realized.”
Recommendations

In this section the recommendations resulting from the validation exercises are listed and categorized. First, the recommendations for the web portal are described, secondly the recommendations for the upload tool and finally the recommendations for the rating and comments tool.

Web Portal

The recommendations for the web portal are described as extracted from the results, namely the heuristic evaluation executed by the experts, the co-discovery method, the top findings and the PSSUQ done by the participants. The foundations of the recommendations are based on the results and on literature, if possible. The WCAG 2.0 standard is mainly used (www.w3.org).

Lay out

General

- Long columnar fields (as shown in products’ information) should be broken up into groups of five, separated by a blank line. There should also be a line spacing of 1.5 to create a better orientation.

Colours

- Complementary colours should be used like blue/yellow, light-blue/orange or dark-red/green). Extreme colours, like signal-red, bright orange, pink and neon, should be avoided. However, colour highlighting is useful to get the user's attention and to create a contrast between colours.

- There should be a consistent category design scheme and style per category. The same colours or comparable colours and backgrounds should be used for all features on the entire website. This also applies to the ‘Review this product’ button. It should be better readable and more contrast should be created. At this moment, the button does not match with the colour-/structure scheme of the entire website.

- More contrast of the characters in relation to the background should be applied. The characters are too small and too thin, especially for people with visual limitations (18pt, or minimal 14pt in bold letters).

- Borders should be used to identify meaningful groups, for example by using different colours, underlining, shading, etc.

Messages and instructions

- Menu instructions, prompts and error messages should appear in different locations, in order to allow for a distinction between the types of messages.

- Filling in wrong ISO-codes, while searching with ‘Advanced Search’, should lead to clear described hints or error messages. Even if the filled-in aspects were not correct, they should not be deleted directly. The user should be able to adjust the written text instead of re-writing it.
• The system has to support both, novice and expert users, by using multiple levels of error message detail, so that everyone is able to understand the error messages.
• There should be a system feedback on every operator action, but on submitted and ongoing searches, the search-button should change its colour or somehow else indicate busy-state.
• The first word of each menu choice should be changed into the most important one.
• In general, character sequences should be avoided whenever possible. Therefore, a screen reader may speak out all the prompts, instructions and information. For example, using abbreviations such as e.g. has to be avoided, to make sure that everyone understands the written text.
• Access to an online spatial menu map should be made possible.
• All entry fields should contain space to fill in up to 19 characters. At this moment, only the entry field ‘supplier information’ has 19 characters (this depends on the browser type).

Categories and terms

Menu names
• Titles of headings and categories should be changed in unambiguous terms. The following suggestions were made: ‘Search for companies’ could be used instead of ‘Organisations’. The menu-names ‘literature’ and ‘new resources’ could be under ‘information’ instead of ‘associated information’. The button ‘general info’ could be named ‘general info about us’. The category ‘info request’ could better be shifted to ‘contact organisation’.
• The different categories and menu-names should all be translated in the chosen language.
• Another category like ‘contact users’ should be installed.

Contents
• The presentation of products and information needs to be organized in a more logical way and it needs to show more information regarding aids.
• Suppliers and manufactures of a product should be named clearly in the description of the product details. There should also be a hyperlink created to contact the suppliers or manufacturers directly.
• The categories have to be filled in adequately with actual and interesting information.
• All information needs to be translated in the chosen language.
• The product’s prices need to be shown in the detailed description.
• The product’s pictures should be displayed in good quality.
• There should be an explanation about the e-mail contact within information about, ‘who is being contacted, what questions are answered?’ in the category ‘info request’.

Interface
Support

- In the category ‘info request’, a dialog box should be installed which shows information about each organisation while going across the flag of the organisation.

- While going across the flag and reading the information about the organisation, there should be the possibility to choose a specific company to which the e-mail will be sent to (see for information that is more detailed also the recommendation before).

- The ‘send’-button for writing an e-mail, in the category ‘info request’, should be located directly beneath the text entry field on the right side. Colours with more contrast should also be used to make it more readable.

- A help function should exist (for example a button ‘HELP’ or a special menu).

- There should also be a button created to ‘Exit’ the menu. By using this button, the user will be linked to the ETNA starting page and all the search history will be deleted.

- The system should intelligently interpret variations in user commands. For example by automatically correcting false written commands.

- The system should colour-code items automatically, to indicate a used link.

Menus

- GUI menus have to offer affordance to make obvious where a selection is possible, so the website can be used intuitively.

- Menus are broad rather than deep. Therefore, a mechanism should be created which allows users to go back to previous menus so that they are able to change their earlier menu choices.

- A better distinction should be made between the two menu-bars at the top by using different colours and more contrast. In addition, the general menu-bar of ETNA has to be integrated in the searching menu-bars.

Search functions

General

- The terms ‘ascendant’ and ‘descendant’ should be replaced by ‘ascending’ and ‘descending’.

- There should be the possibility to see how many pages there are, showing possible results, while searching for a specific product.

- A function to choose a specific letter should be created, while turning pages over to look for a special aid.

- The option ‘searching by alphabet’ would be more practicable than ‘searching by page numbers’.

- There should be a possibility to search by problems/illness while searching for a product.

- The possibility of using a speech synthesizer while making use of the database should be installed.

- A general search button should be created, which is not available in all languages at this moment.
While going across a search possibility a dialog box should be inserted to explain what this search function includes.

The possibility of searching by ‘advanced search’ should be installed in every search function.

Users should be able to reduce the hits after the search because there are too many hits.

**Searching by ISO codes**

- The list of ISO codes should be easier in use.
- There should be the possibility to search with ISO codes by filling-in these codes manually instead of just choosing them from a list.

**Searching by keywords**

- The list of keywords should be shortened and more specified (with regard to several topics, e.g. aids for bathrooms, walking aids, etc.). It should also be translated in the chosen language.
- It should be possible to fill/type in ‘search terms’ of your own.
  It should be possible to make use of sub-topics in the keyword search so the list of keywords could be shorter and easier in use.

**Searching for literature**

- A tab with ‘user information’ should be created. In this category the ‘case studies’ may be placed.

**Error messages**

**Lay out and language**

- To clarify error messages, sound should be implied to signal errors. Very soft tones for regular positive feedback and harsh tones for rare critical commands should be installed for blind people.
- If an error is detected in a data entry field, the system should place the cursor in the affected field or highlight the error in another way.
- The error messages need to be written grammatically correct in all languages.

**System**

- If menu choices are ambiguous, the system should provide additional explanatory information when an item is selected.
- The system should prevent users from making errors whenever possible. Attention-getting techniques should be used with care so that the messages stay unobtrusively to the users.

**Upload Tool**

The recommendations for the upload tool are described as extracted from the results of the online questionnaire. The foundations of the recommendations are based on the results and on literature, if possible. The WCAG 2.0 standard is mainly used
(www.w3.org).

**General**

- At the starting point of uploading an assistive product, it should be mentioned that, if the manufacturer is not uploaded yet, this has to be done before uploading a product of this manufacturer.
- The following aspects should not be mandatory during the uploading process:
  - Organisations:
    - Full name in English
    - Short name
    - Start date
  - Associated information:
    - Author, an author does not exist for each category
    - ICF Code, i.e. at ‘forum’
- The possibility to choose ‘not applicable’ or ‘none of the above’ should be created in the mandatory fields.
- ‘Language’ in category ‘uploading associated information’ should be marked with a ‘*’, because it is a mandatory aspect.
- When choosing a ‘country’ in the category ‘uploading organisations’ the possibility to choose ‘European’ and ‘International’ should be given.
- The possibility to choose more than one country should exist.
- With regard to selecting ICF, codes while ‘uploading associated information’ the option to choose ‘all disabilities’ should be given.
- The dialog box should offer more space to give the opportunity to fill in more characters in all categories.
- A ‘spell checker’ should be helpful to improve the quality of the written information.
- A ‘security safe function’ should to be installed in the uploading process, to guarantee that filled in data will not get lost while navigating away from the site accidently or losing internet connectivity.

**Layout**

- Making use of different colours sizes, boldface, underlining, shading, and/or typography for each category: ‘assistive products’, ‘organisation’, ‘associated information’ and ‘help’, would be helpful.

**Descriptions and help field**

- Making use of descriptions and help-fields per category and aspect on each site would give more certainty to the users. I.e. use of ‘pop up help boxes’ when going across a field.
- Descriptions about terminology used would be helpful; the website might be more understandable for the users.
  - Assistive Products:
“Product name”, it should be clear how extensive does the product name have to be, give an example.

“Primary/secondary ISO code”, an explanation should be given when this option is used and why a secondary ISO code is useful.

“Original language”, an explanation should be given about what is meant by “original”.

“Primary and secondary features” an explanation should be given about what is meant by primary/secondary features

Organisations:
- “Short name”, an explanation should be given with an example
- “Original language”, an explanation should be given about what is meant by “original”.
- “Start date and end date”, what is it meant with start/end date: the date when the organisation was set up or the date when the organisation was uploaded?
- “Country”, which country should be chosen if the organisation is situated in several countries?

Associated information:
- “Associated information” the name should be changed in understandable terminology.
- “Original language”, an explanation should be given about what it is meant by “original”.

**ISO codes**

- The arrangement of the way of choosing ISO codes should be coherent and clear. This could be done by presenting the ISO-codes during uploading ‘organisations’ instead of ‘assistive products’.
- The ISO-codes should be described clearly. There should be a general information button available (that already exists on the homepage) about the ISO codes while uploading.
- Information about each ISO category should be given by ‘pop up help boxes’.
- A descriptive explanation of the secondary ISO-codes would be helpful.

**Delete function**

- The ‘confirm delete page’ should occur in the most used browser types.

**Rating and Comments Tool**

The recommendations for the rating and comments tool are described in this section. The foundations of the recommendations are based on the results of the online questionnaire and on literature, if possible. The WCAG 2.0 standard is mainly used ([www.w3.org](http://www.w3.org)).

**General**

- A gate keeping function should be installed on the rating and comment tool so
that every IP-address could only give one rating per product to prevent the possibility of misuse.

- A native English speaker should check the English language of the description of the rating and comment tool.
- Questions that do not correspond to some groups of products should be inactive to prevent confusion and to avoid corruptive ratings. Therefore, while rating software for example, the unnecessary questions should be deactivated.

**Redirect to the ATIS4all website**

- An information-button or a welcome-text would be useful by entering the ATIS4all-website, so users know they are entering a different website.
- An explanation should be given of why and how to log in the ATIS4all-website.
- The field for the log in name and the password should be bigger and clearer.

**Layout**

- All used columns of the questions should be in the same size to make the screen better structured. This would help the user to better navigate through the layout.
- The columns of the questions should be reduced to one, to improve the usability.
- The layout should always be the same, even if different browsers and browser versions are used.
- The product’s name and picture should be added to the rating and comment tool to make clear which product is rated.
- A ‘return’-button would be useful for better navigation.
- The layout of the buttons regarding the rating should all have the same layout by choosing a bright striking background colour and black fonts.

**Missing aspects**

- Information and questions about the price, the reliability, and the functional practicability of a product would be useful for all users.
- ICT-related questions about how ‘the product/software is compatible’ should be added to the rating and comment tool.

**Review other users**

- Using the symbols of stars instead of multiple-choice questions should improve understanding the outcomes of the ratings.
- In order to have similar features at filling in and the outcome ratings, a button should be created to link to the ‘read reviews for this product’; this button should be located close to the ‘review’ button
- The link to the overview of the ‘review of products’ should be named ‘view full review’ and should have the shape of a button, for better navigation.
Concluding remarks

In this section the overall answers to the research questions are synthesized and further points of discussion are raised.

Web Portal

How adequate in use is the ETNA Web Portal for all kind of participants; what is the opinion of all kind of participants about the usability of the database and how can it be improved?

The participants’ opinion about the ETNA Web Portal is that in general, it is adequate in use, but improvements should be made. End users were in general less positive about the usability compared to the other users. Recommendations were made about the layout, the categories and terminology, the interface, the search functions and error messages.

Upload Tool

How adequate in use is the upload tool for all users and how can it be improved?

In general, participants were positive about the usability of the upload tool and the fact that the upload tool was added as an extra feature to the database. The average rate was 7.0. Adjustments are necessary to improve the usability as formulated in ‘recommendations’. Recommendations were about general aspects, the layout, and the description of help-fields and about the ‘help’ category, the organization of ISO-codes, the error messages, the modifying process and the deleting process.

Rating and Comments Tool

Does the rating and comments tool work adequately for all kind of users, in the opinion of these users, and how can it be improved?

The general experience with the rating and comments tool was quite positive. The average satisfaction was 6.8, although remarks were made, as well as recommendations for improvement. Recommendations were about general aspects, redirection to the ATIS4all website, the layout and the interface, the missing aspects, the content of the questions, the content of the rating and comment tool.

Further discussion points

- The timeframe to perform the validation was limited to a couple of months. In addition, the right order to perform the different parts of the validation makes the time even more limited (i.e. information must be uploaded before the ETNA portal could be tested).
- Furthermore, not all partners were able to perform the tests on the upload tool and the rating and comment tool, due to time issues.
- In the actual plan, it was stated that the PSSUQ had to be performed by more participants by using this as an online questionnaire. This was not done, due to
the limited time and assets to alter the portal within the timeframe.

- The instruction manual was translated into English, and translated again into Italian and Spanish. This resulted in some mistakes in terminology, so some of the instructions were not clear.
- During the testing period, also technical operations were necessary. This sometimes interfered with the testing.
- Due to technical issues, the Dutch participants had to use the Belgian terminology. This is sometimes different from Dutch, but still very comprehensible. This also occurred with the Spanish participants, during the task of the co-discovery method; they had to use English terminology to search by ‘search field’.
- During the performance of the tasks and looking for a ‘community’, some participants were confused to be sent to the ATIS4all website. Therefore, they went back to the ETNA-site and did not look any further. This caused fewer results for this task.
- The PSSUQ is not standardized because of the fact that it has been translated.
- The rating scale of the PSSUQ does not level out the scores very well (four is an average score) so the outcomes on satisfaction with the website turned out to be neutral. An even numbered scale could give a more distinct outcome.
References


http://www.usabilitynet.org/tools/r_international.htm
