User modifications as usability evaluation cues for a Personal Information Space

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Abstract - This paper describes an experiment conducted on a mockup of a Personal Information Space. Users were asked to perform data entry and retrieval tasks, then to modify the mockup according to their wishes and needs. The results allowed to validate the item structure for the future personal space, as well as to assess the role of user modifications as evaluation cues, and for the development of further ergonomic recommendations.

Keywords: Usability evaluation; user modifications; e-gov.

1 Introduction

Internet increasingly offers new services and applications for managing personal information, and plays now an important role in our daily lives. We consult various sites to access information that can be important and confidential. Personal Information Management (PIM) refers to the domain that studies how users manage their data and personal documents. Numerous studies have addressed user behavior: how they obtain, organize, maintain, retrieve, use and distribute their personal information items, according to various roles: citizen, parent, friend, employee, etc. [1]. This study was carried out within the ANR-PIMI project (context: government initiatives for paperless administrative procedures), which aims to develop a Personal Information Space on Internet for supporting remote e-procedures (getting a passport, paying taxes, etc.). It focuses on the intuitive behavior of users interacting with a future system mock-up, that has one particular characteristic: to be modifiable.

Recent work [2] proposed a structure of information items, organized into categories, topics and items. This resulted from several studies: a) an administrative forms analysis, b) three "focus groups" on how people use in order to store their information, and their issues about sharing, c) an online questionnaire on the same topics for a wider range of audience, d) a "card-sorting" study to validate categories created by users and to organize their information. The results show little variation in the structure and in the naming, and allowed the design of a structure with 114 items, 26 sub-categories and 9 categories.

This study complements that approach through an experiment with users to validate the structure, and to investigate shareability. Besides, the focus is on the modifiable nature of the interface to better identify user requirements in structuring/naming personal data, and thus go beyond simple (but useful) questionnaires and interviews, i.e., incorporating users modifications as usability evaluation cues. After a few points on PIMS and tools, this paper offers a literature review on modifiable interfaces. Then, it describes the experimental method and procedure, the mock-up and participants, then the results and their use for PIMI design. Finally the lessons learned and prospects are discussed.

2 Literature Review

2.1 Personal Information Management (PIM)

Organization and information retrieval aspects are the most noted ones. Hierarchical structures are still the most widespread and users favorite [3] [4] [5] [6]. These studies also show users difficulties in creating consistent and meaningful hierarchical structures, and in naming categories/items. Indeed, categorization of new items is considered difficult, with a high cognitive load due to the difficulty in maintaining clarity and intuitiveness of the initial structure. Placing a new item within a predefined structure raises issues of relevance, naming, and redundancy. In our experiment, the structure is already set, but can be modified to fit context of use, vocabulary and user needs. In [1, op. cit.] two types of personal information are identified: information own by the user (files, videos, etc.), and information about the user (identity, health). However, the presence of such information (about the user) in a PIM, its use in e-government procedures and its shareable nature are not much investigated.

2.2 PIMs Tools

We reviewed 15 tools: (#1 www.efficientpim.com, #2 www.thebrain.com, #3 www.essentialpim.com, #4 www.winpim.com, #5 www.lifemanagerpro.com, #6 www.azzcardfile.com, #7 www.pimonline.com, #8 www.pimone.com/pimone.htm, #9 www.myarchivebox.com, #10 www.evernote.com, #11 http://code.google.com/p/keynote-nf, #12 http://www.treepad.com, #13 www.milenix.com, #14 www.android-software.fr/pocket-docs, #15 www.gmail.com). Most tools (#1, #2, #3, #4, #5, #7, #8, #11, #12, #13, #15) offer an agenda, a calendar, a contact list, a keyword based search tool, a centralized password management function and notes editing. The naming of concepts / items is a problem for some tools (#1, #4, #7), an information structure already established is rarely offered, except for (#9) where a data categorization proposes a multi level structure of

categories/information, for (#1) and (#14) where simple structures are available for storing documents. Actually, in (#9) and (#14) data entry is not permitted, only files loading; also most allow to construct categories of notes/sub-notes, and tasks. On the content side, except for (#9), there is no structure/format for useful information such as: identity, family, health, income, ID papers, career, etc. Most interfaces are quite similar. (#1) further allows the user to view the schedule for the day, week or more. An interface customization is also possible in (#1, #3, #6, #8, #10, #15), whose main modifiable parameters are: color, window size, language, position and display menus/buttons.

2.3 Modifiable Interfaces

A challenge in the near future is the design of systems that the users can "develop" and change themselves. However, not everyone has programming expertise. The ability to modify, adapt, configure and increase the flexibility of use should allow users to continuously adapt their systems to their needs, their contexts of use and include their personal preferences [7] [8]. It may be adaptive or adaptable, or mixed initiative. It is adaptive if its mechanisms do not require user initiative and adaptable when changes are made upon direct user requests during use. In [7, op. cit.] two types of user activities are distinguished: setting among available alternatives (presentation, interaction mechanisms, or behavior), and software or a new artifact creation/modification, for instance macros. Four important interface customization factors [9] are to be considered during design for understanding the potential impact of custom interfaces on the performance of key tasks and user awareness: (a) customization control, (b) modification granularity: all the interface changes, several changes per session, one change at a time, etc., (c) the visibility of the modification, i.e., the different ways to show that a modification can be achieved (spatially: hide, move, copy and resize; labeling techniques: highlighting, and (d) the rate of change (in the case of an adaptive interface, it concerns every interaction; if it is adaptable, it will depend on user needs and availability: the frequency will then be lower).

In the literature, there are few contributions on user modifications in systems design/development. Users - Developers communication during the design process is not obvious. The various resources provided by developers are not always understood by users. Means of exchange about product development should be included in the artifact itself, i.e., during system use, and from the changes proposed by the user [10]. In this context, [11] describe MikiWiki, a shared environment where the design teams, including end users (as the domain experts) can communicate/write in a wiki style, with HTML and JavaScript to tailor communication and collaboration tools. This allows a collaborative design process by providing basic prototypes allowing users to remix, edit and create their own objects. Usability tests with users are planned on different scenarios. On the same topic, [10, op. cit.] experiments were conducted with two different systems to evaluate editing techniques/tools. Scenarios with modification tasks were submitted to users. The authors particularly wanted to show that multiple representations (different levels, different categories of users) can facilitate developers - users communication, and stimulate modifications. [12] conducted experiments with two systems to test the ease of user interface redesign in the context of plasticity, as well as to verify tasks remodeling acceptance by users. They use each system on a mobile platform, then a PC. Users are invited to adapt their interfaces according to the device used (screen size, font, etc.). The results show that, in the laboratory, with a short operating time (2h), discovery is difficult, meaning users did not realize what they could really modify (visibility issue); few changes were made by users. In [13] a novel environment for modeling business processes is proposed, allowing users (business process experts) to model and adapt the processes themselves. User tests were conducted to evaluate the interfaces, and their acceptance, but the prototype used did not allow modifications for users to adapt and adjust their processes. A new prototype should be implemented.

In short, very few experimental results were found about user modifications as a means of usability evaluation, during design or not. This study on a mock-up intends to complement the few above studies by providing new empirical results. It deals with the adaptable and customizable interfaces aspects. Users were invited to participate in an experiment with a mock-up of a PIM system (during design stage), and allowed to modify the structure and naming of information items. The results were used for an ergonomic interface specification. All adaptations were made from direct requests from users during use (customizable interface), not through adaptivity where the system, not the user, has the initiative. It can be said, as [14], that it is "light" EUD (End-User Development), i.e., "tailorability". This form of "adaptability" is justified by the different situations of system usage (at work, home, leisure), and by the difficulty of predicting new situations, on different technological platforms available (pc, mobile, tablet) and the wide variety of user profiles (expertise, functions) for which the products are intended.

3 The Experiment

The experiment concerned the study of the intuitive behavior of PIMI users. Users have been put in position of using a Personal Information Space in order to validate the predefined structure [2, op. cit.], and to observe their behavior facing an editable interface.

3.1 Material

The mock-up (Fig. 1) was developed with AZZ Cardfile, an information management software for configurable card files. AZZ Cardfile file organizes categories, topics and items. Each category is represented by a "group", and within groups, each section is in the form of a card that contains the items represented in a table form. The mock-up allows users, in a predefined structure, to: Enter information items; Browse

categories and headings for information retrieval; Change names of categories, topics and items; Modify the structure (moving headings and items, creating redundancies, adding new items and delete items).
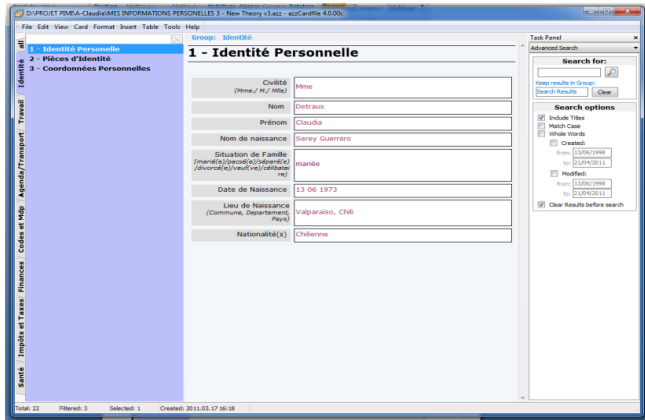

Figure 1. Screenshot of the PIM Mock-up

After an initial design, the structure was redesigned following additional qualitative analyses. The structure has 91 items organized into 30 topics and 8 categories: Identity & Contacts (personal identity, ID papers, personal details); Work (current work, affiliation details, career); Contacts & Agenda (personal & professional agenda and contacts); Transportation (private, public); Codes and Passwords (entry codes, locks, phones, passwords, websites, credit cards); Finance (income and benefits, investments, loans, bank accounts); Taxes (income tax reference, tax reductions, tax bracket, property tax, housing tax); Health (social security, health insurance, medical records).

3.2 Method

The sessions were conducted individually and supervised by the experimenter. They were all recorded (Dictaphone). Users were asked to think aloud, the experimenter being thus able to identify specific issues using also observation records.

3.3 Participants

The user population for our PIMI tool being very large (the citizen in general), we focused on profiles easily accessible, i.e., participants from the project partners institutions: 6 researchers, 6 administrative staff (INRIA Rocquencourt) and 11 university students (IUT Tarbes). The participants' characteristics are: 14 male (60.87%) and 9 female (39.13%); age average 36.8 years (sd: 12.51). Among the "researchers", all participants are male, the age average being 42.8 years (sd: 17.84). For "administrative", all participants are female, the age average being 44.8 years (sd: 9.68). In the category "students" 8 participants are male (72.72%) and 3 female (27.28%), the age average being 22.9 years (sd: 6.53).

3.4 Procedure

To be ecological, the sessions took place in the participants' own working environment (actual offices of researchers and administrative; university computer room for students). This way, they could easily access their belongings (bags, wallets, diaries, personal and work computers) to achieve the required experimental tasks. The mock-up was presented on a laptop. A pilot test was conducted to validate the experimenter discourse and to calibrate the experiment duration (about 1h). The sessions were conducted in two main phases: one phase of work on scenarios/tasks and a customization phase. The latter consisted in making changes in the Personal Information Space and to answer a questionnaire on information shareability.

3.4.1 Scenarios Sessions

The objective in this phase was to assess the difficulties in finding the relevant topics in the proposed structure and in understanding the terms, but also to observe the users confidence levels in their data entry. Each scenario deals with data that was previously detected as sensitive.
- *Scenario 1* - Discovery and Identification: data entry tasks (name, ID card, etc.). The goal was to familiarize users with the tool, its contents, to start customizing and to develop a sense of ownership.
- *Scenario 2* - Contact (professional) and Work: data entry tasks. The aim is mainly to check if the users can find these items (previously conflicting) in the structure.
- *Scenario 3* - Health: data entry tasks of "sensitive" information to verify users adherence to this topic, and to validate naming.
- *Scenario 4* - Data Retrieval: the tasks allowed to verify if the classification is appropriate to user expectations, focusing on items that presented conflicts in previous work. In this scenario, the task is to complete a registration form (fictional) and to seek information (also fictional) about another person.

3.4.2 PIMI Personalization

The goal in this phase was to cover the whole PIMI structure and allow users to modify it (as well as the naming). With the experimenter's help, the users were able to change categories topics and items location, add redundancy, change names and delete or add items. The mock-up allowed "drag and drop" to move items, and simple editing to change names. At the same time, the participants answered a questionnaire on the shareable nature of each information item.

4 Results

On a total of 23 sessions, only one participant (student) did not allow session recording and one participant (administrative) did not respond to the shareability questionnaire. All others have followed all steps and allowed the use of a Dictaphone. The average session duration was 68.4 mn. (sd: 16.57 mn.) which was, overall, a bit higher than initially estimated (60 mn.). For researchers, the average was 72.8 mn. (sd: 17.15 mn.). For administrative, average

duration was 66.67 mn. (sd: 17.73 mn.). In the student category, average length of sessions was 66 mn. (sd: 16.53 mn.).

4.1 Shareability

Before discussing structure and naming aspects, a few results on information shareability are worth mentioning. From the scenarios, the most sensitive items are: "identity documents" particularly "ID Card", and information under "medical records". The other elements were easily shared: little hesitation, reassured by asking questions before entering the information. Only 1 administrative participant has not responded to the questionnaire and only 4 participants (a researcher, one administrative and two students) said they did not want to share anything, and restricted information sharing to the minimum, and only "on demand" knowing in advance the underlying rationale of the requests. There is also a strong suspicion towards the categories "Agenda," "Finance" and "Codes", also observed in the modification scenario where they were among the most deleted topics. However, the headings "Identification Documents" and "Medical records" were not considered critical in this analysis as opposed to the outcome of the data entry scenario.

4.2 Difficulties in finding information

From the scenarios, a few items were difficult to find in the structure:
- *Personal Details:* section easily localized in the data entry task, but 6/23 students in the data retrieval task of "Phone Number" searched first in the Personal Identity section and suggested two different sections displayed on the same page.
- *Professional Contacts:* if this item was placed in the "Work" category, it would be more easily found, as 86.95% of users went directly searching in that category.
- *Professional details:* item easily found in the "Work" category whether in the data entry scenario or the data retrieval. However a user asked to group "current work" and "business contacts" on the same page.
- *Annual net income:* the placement of this item is not always accepted. 26.08% of users have had the tendency to seek information in the "Work" category, saying that salary is information corresponding to work, to the job. Other users also searched in the "Tax" category and confused it with the item "income tax reference." These may need to be apart, with description attributes that identify them more specifically.

4.3 Naming difficulties

The terms that raised most questions and understanding difficulties are the following:
- *Authority:* 17/23 participants had difficulty understanding the term (4/6 researchers, 6/6 administrative and 1/11 students), who all have taken some time to understand it. 6/11 students did not understand the term at all and needed help. This is explained by the fact that on the ID card, the term used is "Issued by".

- *Medical Records:* 16/23 participants have made comments on the terms in this section. 10/23 made statements like: item "very vague", "very large", "lacks precision", "do not understand what we are asked".
- *Membership Number:* 14/23 people were confused by this term, of which 4 have failed to understand without help (2/6 researchers and 2/11 students). The 10 others (3/6 researchers, 4/6 administrative and 3/11 students) have thought a bit and wondered if it was the social security number.
- *Current work:* 14/23 people had difficulties understanding the terms of this section (4/6 researchers, 2/6 administrative, 1/6 students), but after some time, they managed to understand. 2/11 students and sixth administrative failed to understand and asked for help.
- *Extension Number:* 10/23 participants mentioned this term. 1/6 researchers and 3/11 students did not understand, even confusing it with postal code. 1/6 researchers, 3/6 administrative and 1/11 students have thought deeply, but despite doubts, have answered the question.
- *Birth Name:* 5/23 participants (21.73%) had difficulty understanding this term. 2/6 researchers have been slow to understand, 2/6 administrative and 1/11 students have not understood at all.

4.4 PIMI personalization

After the scenarios phase (entry of personal data and retrieval of information from another PIMI to complete a fictitious registration form), participants were invited to discover the entire PIMI and to make changes. After testing the system, understanding its use, they expressed their needs, desires and limits in proposing modifications. This phase of the experiment was very well accepted by participants, even after spending about 30 minutes in the first phase, they took their time in the second phase.

Looking at Table 1, one can identify a total of 129 modifications suggested by users, averaging 5.6 per user (sd: 4.01). Only 3 out of 23 (2 researchers and 1administrative) have not made any changes. The participant who made the most changes suggested 15, while two people have suggested only 2 changes. By analyzing user groups, we can see that the "Students" are those who have made the most changes with an average of 6.81 (sd: 2.7). The "Administrative" is in second place with an average of 5 changes (sd: 5.4). Finally the "Researchers" follow with an average of 4 changes (sd: 4.42). The standard deviations show that the "Students" are clearly the most homogeneous group in terms of changes.

Table 1 also shows the 2 main modifications types: a) PIMI structure, and b) PIMI naming. Most changes are structural (108): mainly additions (44) and removing elements (36). Even if the changes are structural, the addition and/or removal of items, overall do not challenge the proposed conceptual structure. Users simply want their Personal Information Space set in details according to their own needs and wishes.

Table 1. Modifications proposed by the participants

| PARTICIPANTS | MODIFICATIONS (by participant) | | | | | | | | NAMING | Total Modifications (by participant) | Total, Average & Standard-Deviation (by participant) | | |
| | STRUCTURE | | | | | | | | | | | | |
	Items Moved	(sub) Catégories Split-up	Items Grouped	Redundancies	Items Added	Items Removed	Items Order Changes	Total Modifications Structure			T	A	S-D
C1	1	2	0	0	1	1	1	6	3	9			
C2	0	0	0	0	0	0	0	0	0	0			
C3	0	0	0	1	1	0	0	2	8	10	24	4	4,4271
C4	0	0	0	2	1	0	0	3	0	3			
C5	0	0	0	0	0	0	0	0	0	0			
C6	0	0	2	0	0	0	0	2	0	2			
A1	0	0	0	0	1	0	0	1	2	3			
A2	0	0	2	0	2	2	0	6	1	7			
A3	0	0	0	1	0	0	0	1	1	2	30	5	5,4037
A4	0	0	0	3	10	2	0	15	0	15			
A5	0	0	0	0	0	1	0	1	2	3			
A6	0	0	0	0	0	0	0	0	0	0			
E1	0	0	0	0	2	2	0	4	0	4			
E2	0	0	1	2	3	3	0	9	1	10			
E3	1	0	0	2	6	0	0	9	0	9			
E4	0	0	0	2	1	0	0	3	0	3			
E5	1	0	0	0	1	3	0	5	0	5			
E6	0	1	0	1	1	1	0	4	0	4	75	6,8181	2,7863
E7	0	0	0	0	1	3	0	4	1	5			
E8	0	0	0	0	1	4	0	5	1	6			
E9	0	0	0	0	3	6	0	9	1	10			
E10	0	0	0	1	6	2	0	9	0	9			
E11	0	0	0	1	3	6	0	10	0	10			
Total	3	3	5	16	44	36	1	108	21	129			
Average	0,1304	0,1304	0,2173	0,6956	1,9130	1,5652	0,0434	5,8695	1,7855	5,6086			
s.-d.	0,3443	0,4576	0,5997	0,9261	2,4478	1,8787	0,2085	4,67391	1,7558	4,0197			

Some statements from interviews recordings illustrate their desire about what they will really use and what they imagine to need according to their lifestyles: "... I have everything on my I Phone, I do not need another agenda ...": he removed the category Calendar / Contact; " ... residence permit, I remove, I'm French, I don't need it ... : he removed that item; "... For now I use my phone agenda, but if later I want to use it ..." : he removed the Agenda section.

The changes that could influence most significantly the PIMI structure are: moving Items (3), split-up of categories/sections (3) representing only 5.5% of changes to the structure and 4.6% on total changes. Regrouping modifications (5) and changes of display order (1) represent 5.5% of structure changes and 4.6% of the total changes. They are focused on information presentation.

Changes on naming represent 16.27% of the total proposed changes. Most are synonyms that users prefer, such as "Birth Name" which becomes "Family name", "Individual Transportation" becomes "Personal Vehicle". Other include either more specificity or more generality, such as, respectively, "Extension Number" which becomes "Telephone Extension Number", "Engine Belt" which becomes " Technical Control Date".

There are 3 *items and categories displacements*: one by one researcher and two by students. However, this result corroborates the scenarios session where the category "Finance" lacked of clarity and led to a misunderstanding of the terms. For those unfamiliar and little used terms, definitions and examples should be provided. The use of redundancy will also help users find their information.

Separation of categories/sections: The split-up of the category Events/Contact led to 3 changes and was also subject to question during scenarios sessions.

Grouping of elements: 5 users preferred to display on one page items all related to "coordinates". This may not be surprising as coordinates are always linked to an individual (personal identity) or a place (work).

Redundancies (placement of the same element in two different categories/topics): 16 redundancies have been proposed: 9 by students, 4 by administrative and 3 by researchers. The Professional Contacts section, initially in the category Agenda/Contact, was duplicated in the category Work by 8 participants. This reinforces the results of the previous step where Professionals Contacts were searched primarily in the category Work. The Social Security & Mutual section was cited by 2 participants, wanting to see it in ID Papers or in a new section including "any type of papers". Other elements were cited only once.

Adding Items: Additions are numerous, but mostly proposed by 1 person each time. There is, overall, a desire of users to customize the structure: even though 6 people did not add any item, all others have proposed at least one addition. One item is particularly requested: attached document as proof (suggested by 10 participants including the attached Résumé suggested twice). Other items were added: Car ID card (3 times) and organ donation (twice).

Removing Items: This type of change was the second highest type of modification (36) and involved 21 different elements. The category "Codes" has been removed completely by 6 participants, mostly (5/6) students. Then

comes the "Credit Card Codes", deleted by 4 students. Also in the category "Codes", the item "banking site " under "Internet Codes" was removed by 3 students. The category "Agenda/Contact" was removed by 2 users, while 2 users deleted the Agenda section, bringing to 4 those who removed the Agenda section. The category "Finance" had seven of items deleted, a user even removed completely that category. The "Students" group is the one that removed most elements (total 30, average per participant 2.72) followed by administrative (5, average 0.83) and finally the researchers, where only 1 researcher proposed a deletion.

Overall, deletions are focused on 3 main categories: "Codes" "Agenda/Contact" and "Finance." We can differentiate the 2 categories "Codes" and "Finance" from "Agenda/Contact". Indeed, the reasons for removal (recorded comments) tend to group "Codes" and "Finance". Deletions for these 2 categories were caused by strong distrust in confidentiality and security of sensitive data. For "Agenda/Contact", the removal arguments put forward by users link redundancy with current systems (iPhone, paper agenda, phone, etc.). Also the students are the ones who express more distrust for the categories "Codes" and "Finance."

Naming: 3 terms that were changed are the ones that caused problems in understanding the data entry from the previous step: Birth Name, Authority, Extension number (although by a single person). 16 terms were changed, 3 of them by more than one person. Other proposals are synonyms for easier retrieval.

5   Conclusion

This study dealt with the adaptable nature of a Personal Information Space and how this could influence its acceptance. The literature review revealed little results on user modifications, especially from a methodological point of view, as an additional means for evaluating usability. Experimenting with an editable PIMI mock-up aimed at complementing this state by providing some initial experimental results. Useful information was obtained on how users enter and retrieve data, by modifying the interface settings. The modifications proposed were captured, then classified and analyzed according to their type and their underlying rationale. Finally we discussed the impact of these results on the PIMI system design.

The proposed structure, classification and item relevance in different categories and topics have been well accepted by users. The most fundamental changes (of the structure) represent only 5.5% of total changes. On the other hand, the total number of changes (129) and the participation of most users (20/23) during this modification stage allowed to witness a real interest from the users to express their needs. The only 3 participants who did not make any changes indicated that the structure suited them, ... although some

elements could be different, ... and that they would eventually get used to it !

We found some consistency regarding the structure, organization and naming between the results from the scenarios session and the modifications session, which led to some adjustments in the structure of items.

By cons, regarding data sharing, we found that some usually called "sensitive" information in the data entry scenario (ID, Medical Records) is no longer considered sensitive during the modification of the interface. We assume that being able to decide with whom the user wants to share each item gives the user confidence in relation to the system, where sharing is agreed or not by the user. Similarly, the "medical records" section was treated rather in detail by the user who has decided not to share sensitive items, but for the items considered important to share (e.g. "blood type"), he decided to share them without hesitation.

Overall, it seems preferable to provide flexibility and means to adapt the interface rather than risk the rejection of a system [15]. Interfaces changed during the design process seem to stimulate the future user. Indeed when the user moves to the customization step, he/she changes attitude and becomes an "actor". In addition, he/she has a greater feeling of consideration. The possibility of customizing the interface promotes its acceptance, in addition to lifting the participatory barrier.

From the designer's point of view, the act of gathering customization ideas from users, in the early stages of design, from a modified mock-up, allows to check consistency of the basic structure, but also to make it flexible for different profiles identified and for the continuous change (age, work, etc.) of an individual. Moreover, it would seem sensible to consider several settings levels, depending on user profiles. Younger ones (students) seem more interested in the creation or deletion of "mini-structures." Other profiles opted instead for changes in details, naming and presentation.

The results led to some modifications to the structure of items and to propose a set of recommendations [16] intended to stimulate discussion and provide a basis for the specification of the new PIMI interface, for instance:

- Customize the structure naming. From a fixed number of synonyms, users should be able to choose the most significant one(s). Other synonyms can also used to "tag" this term, increasing the search tool power.
- Allow users to remove from their Personal Information Space elements they wish, providing the coherence of the structure is maintained.
- Allow users to reintroduce elements previously removed.
- Create some redundancy that should facilitate items search of by users, consistently with the structure.
- Allow users to specify the information they want to share and with whom they want to share it.

- Information should not be shared initially ("by default"), then the user should be able to express shareability by two methods: (a) "by Request" the user allows sharing from a request (institution, service, another person, etc.) specifying its permanent or temporary nature, (b) "item by item", as the user wishes.

In general, users are quite demanding about all that a new tool can offer them, including about the interface, about system features such as data synchronization, information security, and access by PDAs. They know the benefits and do not want to move backward technologically.

The end users will not replace software developers, but it is important to give them power of adaptation at a level of complexity suited to their abilities, especially for systems where information is very personal. This requires providing interfaces easy to modify and tailorable to a wide audience.

Further work will focus on a PIMI prototype (instead of a mock-up) and will focus particularly on the visibility of changes [7], this aspect not being addressed with the mock-up, the modifications being made with the experimenter's help. This prototype will be accessible via internet allowing also to expand the experiment to a larger population, with more variations in terms of user profiles.

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