up using it. Also, some of the views were judged crowded and hard to understand, which is why users recommended simple, plain screens with fewer icons and more intuitive metaphors.

Comments regarding the crowded interface were: "*Too much information at the same time*", and "*I see a big mess*".

In the following we detail the comments and feedback received in each section and report the percentage of cases where users needed help to perform the tasks assigned, as computed with the formula above.

Activities

Some concepts, such as the activity dashboard, were considered to be not useful by the participants. The activity dashboard consisted of a view designed for the users to keep track of their achievements, monitor their goals, upload photos of a specific activity they attended, and even challenge their friends with their accomplishments in similar categories. The part regarding the competition with friends was deemed unnecessary, however it has been noticed that users were particularly interested in the part of the dashboard featuring the photos of the activity, as a matter of fact they found the possibility of sharing photos to be enjoyable, and they would definitely use it to share their experiences with people that participated to the same activity.
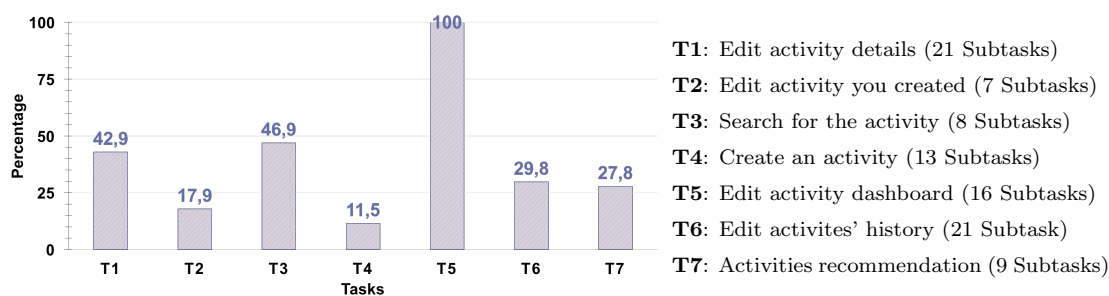

T1: Edit activity details (21 Subtasks)
T2: Edit activity you created (7 Subtasks)
T3: Search for the activity (8 Subtasks)
T4: Create an activity (13 Subtasks)
T5: Edit activity dashboard (16 Subtasks)
T6: Edit activites' history (21 Subtask)
T7: Activities recommendation (9 Subtasks)

Figure 41. FriTab pilot study - tasks of the Activities feature.

The tasks that were easier to accomplish were editing activities they created and creating new activities (respectively T2 and T4), where help was needed only 15% of the time. Whereas the hardest to understand was the indoor navigation view, which was a feature suggesting how to reach a point of interest in closed spaces, like malls or museums.

The views regarding the editing of activities history (T6) and activity recommendations (T7) received mixed comments, and help was needed in 30% of cases. For both concepts, the icons were not intuitive, especially for the activities recommendation view, while the majority of the other subtasks were quite clear.

Groups

The views that required more help in the Groups section were 'groups recommendation' and the 'create your activity group' (T2 and T5). In these views, almost half of the users needed help throughout the entire process. For the 'groups recommendation' view, where it shows suggestions made by the system for new groups the users might want to join, the only icons that were clear to the participants were the 'close' and 'go back' icons.

The 'search activity groups' screen (T4) was criticised by the users who would like to have it on the main Groups screen, and not being redirected to a new window. Also symbols in that view were hard to understand. In 25% of the subtasks people were provided help in order to accomplish them.

The most understandable part was the editing user groups (T1), because the participants said the icons were simple and the view was well organised. For the 'edit activity groups' (T3) it is reported in Figure 42 that 4.5% of subtasks needed help, but this number is actually gathered from half of the participants, because the other half got frustrated and decided to give up on the entire task.

Finally, the activity groups recommendation view (T6) received criticism about the icon used to represent it, also the usefulness of this function was unclear, although the overall help needed was around 17%.
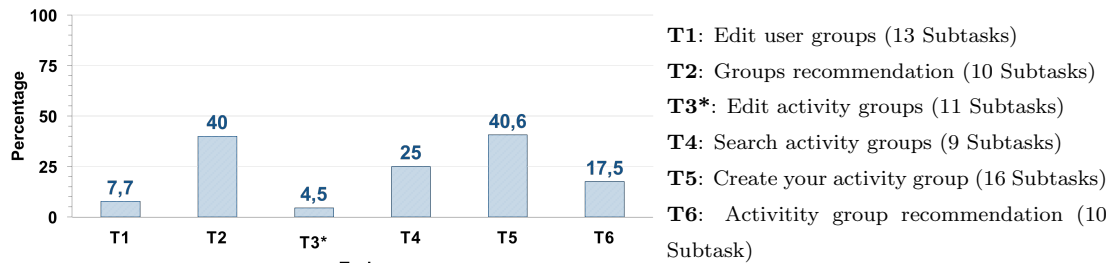

T1: Edit user groups (13 Subtasks)

T2: Groups recommendation (10 Subtasks)

T3*: Edit activity groups (11 Subtasks)

T4: Search activity groups (9 Subtasks)

T5: Create your activity group (16 Subtasks)

T6: Activitity group recommendation (10 Subtask)

Figure 42. FriTab pilot study - tasks of the Groups feature.

Cross-validation

A cross validation has been performed by three people from the ACANTO team, to focus on the most important problems our participants had, and find ideas to solve them. We divided the cross validation in two parts: Conceptual issues and Interaction issues. Conceptual issues described the possible conceptual problems users had during the evaluation, such as the concepts of parts of the app or their usage, while Interaction issues defined other issues users encountered, such as understanding icons, usability problems, and so on.

We read the document summarising the results of the user evaluation alongside our notes with the comments given by the users, and compiled a checklist to categorize every problem and feedback we obtained. The problems were categorised as either conceptual issues or interaction issues. These were divided into further subcategories and each issue was assigned a severity rating. The results of this analysis are reported below.

Results

Conceptual issues were divided in two subcategories: Metaphor and Attraction. Metaphor describes a set of user interface visuals, actions and procedures that exploit specific knowledge that users already have of other domains. The purpose of the interface metaphor is to allow the user to transfer knowledge about how to interact with the user interface. Attraction represents the way users perceive the concept, and their level of engagement with it.

The Interaction issues category was split in four different subcategories: Usability, Aesthetics, Content, and Customisability. Usability can be described as the ease of use and learnability of a human-made object such as a tool or device. It includes: ease of learning, efficiency of use, memorability, low error frequency and subjective satisfaction (Hartmann, Sutcliffe, & Angeli, 2008). We used Aesthetics because it reflects the format in which the content and services are presented, as well as the design, look and feel, and overall experience with the system (Hartmann et al., 2008). Content was used for the set of services describing the functions of the interface and its utility. It should be appropriate and interesting. Lastly,

customisability describes the ability for the user to adapt the system to his or her needs, which can encourage users to take ownership over a system and has been found to influence perceived usability and aesthetics (Hartmann et al., 2008).

All the problems that have been categorized as described above were assigned a severity rating, to identify the gravity of the problem they referred to. The rating went from 1, which meant 'not a problem', to 5, meaning 'high impact'; we used number 3 as the neutral rating. Every rating was supported by the comments, if any, made by the participants during the sessions. From the cross validation, we observed that icons like the X to close a menu, or the arrow to go back, did not create issues among the participants, probably because they are already aware of these from their smartphones or computers that they use every day. The introduction of new icons was the main problem, because there were too many and they were not fully aware of the functionality of the system to be able to match possible functionality to a specific icon. We observed that the main problems were about the metaphor and the aesthetic of the icons, and about the users' memory of how the system worked.

6. FriTab mockup main evaluation

Following the pilot study, modifications of the mockup and the procedure were made. We organized a new study with more participants. Two main goals of the study of the FriTab mockup were:

1. to get insights into older adults' experience of the main FriTab's features;
2. to assess overall UI quality, using the framework for UI quality analysis (Appendix 6).

Participants

The study involved 12 independently-living older adults (7 females, 5 males; age range 65-73; Mean=69, Median=69). The participants were all from the city of Trento, Italy. 10 participants had previous experience with touchscreen devices. 9 participants had previous experience with online social network applications mainly to maintain contact and communicate with other people.

Materials

The interview script can be accessed using the links below [4], and the mockup is also available online (http://bit.ly/2vSJXt5). The differences between the previous mockup and the one reported in the study can be viewed by comparing the two UIs by accessing the links, but briefly, the key differences are:

1. A simplification and reduction of the structure. The calendar and activities pages are now merged into one screen.
2. The groups component is simplified to show more about the groups on the page.
3. Alteration of icons that were difficult to understand.

Procedure

The study consisted of 12 semi-structured sessions that were conducted at participants' homes. A researcher ran all the interviews in the native language of the participants.

At the beginning of each session, a participant was introduced to the FriTab as a means to promote social networking and taking part in activities, and invited to sign a consent form. To protect anonymity, each participant was identified by a string of letters (initials and nationality) and numbers (birth year). The session continued with a few exploratory questions related to the participant's previous experience with touchscreen devices, and social networking applications and systems for organizing activities. These questions were used in order to gain a better understanding of the participant's experience with similar technology. Then the participant was provided with the description of the specific feature and asked generative questions on previous experience with the feature, expectations from using the feature, and understanding of the label and icon used for the feature. Following general questions, the participant was asked to complete a set of tasks for the feature, where each task contained subtasks that described atomic actions on the mockup (such as

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[4] FriTab mockup evaluation interview script: http://bit.ly/2vgjZm6 (questions); http://bit.ly/2vShxiN (checklist).

button click or text entry). During the task execution, a checklist was filled in for each subtask to record whether it was completed autonomously or the participant needed assistance, the comments made by the participant as they were encouraged to "think aloud", and notes of any other issues arising.

Results

The sessions were audio recorded and transcribed. Transcripts were used to update the checklists. Two researchers worked independently on analyzing and translating the checklists into English. Disagreements were discussed and resolved by the researchers to establish a common transcription. Then the transcription was used in two independent analyses. Disagreements were discussed and resolved by the researchers to establish a final analysis reported as follows.

Authentication

The participants had previous experience with authentication in systems such as e-mail, online shopping (Amazon), websites for communicating with the public and health services, online banking, or when accessing computer. All participants found the authentication procedure clear ("*flowing*" (AC67F)). A participant highlighted that: "*[the procedure access] works like everywhere, so it's better to have always the same [procedure]*" (AP71M).

9 participants agreed in using the label *Authentication*, since they were familiar with it ("*Yes [the label "Authentication"] is something that I understood immediately*", AP71M). Some of them suggested different name for the feature, for instance "*Identification*" (MB73M; VM65F), "*Entrance... […] "For entering". "First entry", or "Start*"" (RZ71M). The symbol used in the first page (open door) was appreciated by almost all the participants, since it was considered "*nice and effective*" (VM65F). A participant reported: "*I like the symbol because it's intuitive, I mean you understand that you're entering the system*" (AD69F). Only one of them stated that "*It's not understandable at all that you have to enter from there [door icon]*" (RZ71M).

All participants completed subtask *entering username and password* successfully. One participant was confused with the procedure for telling the system to remember user credentials for future access. In the following view, another interviewee misunderstood the way for continuing to the next page: "*For going forward maybe I'd click on "Continue" not on the arrow, because it's more instinctive to do that...*" (AC67F). Even if it did not create problems in the subtask execution for them, three other participants expressed the same concern.

10 participants liked the idea of seeing their progress after entering the system and found it useful. Being an incentive to be more active was highlighted as the main benefit from this view. "*[...] It could be an incentive to do more [physical] activity and to dedicate more time to it.*" (CS66F). "*You set your goal and see every day if you've reached it, if you've improved.*" (MB69F). "*I like it because it gives me the idea of my evolution let's say […].*" (AD69F). However, 2 participants expressed concerns. A participant reported: "*I don't understand. I've just accessed and [the system] tells you the progress you've done until now. What kind of achievements?*" (RZ71M). Another participant highlighted: "*Sincerely I would prefer much more...but it is a personal opinion...a mathematical diagram in place of butterflies, etc. Even if it is clear also from here, but for me it would be much more intuitive a diagram*" (AP71M).

Profile

Overall feature experience

The concept of *Profile* was familiar to the participants. 11 participants agreed to keep it as a label of the section. ("*I've heard it so many times […] that I believe it's understandable what it means.*" (RZ71M); "*I believe that it is the word that nowadays most immediately gives the idea of this initial identity.*" (MC73M)). In general, participants expected that they had to provide personal data (as name, place of residence, e-mail, professional information, gender and age) when creating a profile, but some of them also anticipated the need to enter information related to personal interests ("*[I expect it to contain] my data related to […] things that I like, that I do, what I do in my free time [...]:I like to read, to walk, etc.*" (AD69F)). For this reason, 1 participant suggested to change the label of the feature to "*Profile and similarities*" (MB70F), in order to make more evident that the information contained in Profile enables to connect with people who have similar interests.

The profile icon was clear to 10 participants ("*I believe [the icon] is effective. It's the person, I mean, it indicates the individual.*" (FF67M).

Table 1. Task completion description for Profile feature.

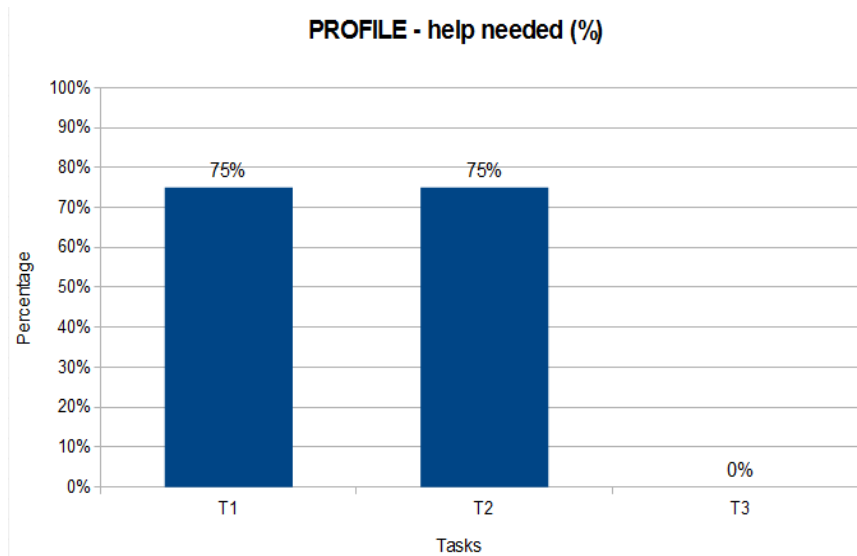| Task	No. ofsubtasks	Subtask	Help needed	Description
T1 – Edit basic profile information	15	Enter edit mode (pencil)	9	Icon not recognized and associated with anticipated purpose.
		Edit photo	1	
		Enter email	1	
		Enter username	1	
T2 – Edit interests	6	Add interest icon (new page)	3	
		Search field	2	
		Add specific interest	2	
		Remove interest	2	
T3 – See upcoming events	3	-	0	

Figure 43. Profile – task completion overview.

T1 - Edit profile information

Overall, the pages containing profile information were clear and understandable by the participants. The participants reported that they would feel comfortable in providing the related information if it was their own profile. The participant said: "*I wouldn't have problems in providing this kind of information also because that is usually the one that is always asked for.*" (AP71M). The feature for editing one's profile was perceived useful by the participants. A participant pointed that "*life changes and I can keep [the profile] updated.*" (VM65F). Some other participants related the feature to the purpose of the system ("*[...] these are the bases in order to get in contact with someone that organizes something that interests me*" (CS66F); "*[...] you insert the place of residence so that it's easy to find people nearby with the same interests, or events*" (MB69F)).

Nevertheless, 9 out of 12 people (75%) needed help in the execution of the related task (Figure 43).

In particular, the icon (pencil) to enter edit mode was not recognized by 9 participants. Instead, they clicked on the profile photo or the name of the person. The meaning of the icon was not recognized which implies the metaphor problem (Hartmann et al., 2008). However, once informed on the meaning, the participants recognized the pencil symbol as entering edit mode in later usage. Thus, once the participants learned about the meaning of the icon, they correctly used the icon in successive tasks. For example, when asked to edit the password in the profile page, some of them decided to use the alternative procedure of using the pencil icon, instead of clicking on the nearby field like for the other voices to edit ("*This! Now that I understood it, [I would click on] the little pencil automatically. Because like in many other sites, you see the first time [how it works] then you understand.*" (MB70F)).

T2 - Edit interests

All the participants considered as important the possibility to specify their interests to the system since, in the participants' words, "*the information that doesn't interest me is already skimmed, so from the beginning you can be focused [...].*" (CS66F); "*[...] If you're looking for a group that shares your interests in order to do something*

together this thing can be useful." (AC67F); "[...] you can concentrate the search for event limiting it to your interests." (MB69F). Furthermore, it was appreciated the chance to edit, because "I may have certain interests for a certain period then for the age, physical problems or personal reasons (maybe I found other interests) I can change them." (MB70F).

Almost all participants acknowledged importance of providing preferred interests to make the social network work ("I hope that it will show me the things that interest me the most, based on the information I provide." (AP71M); "[I would expect that the system] "gave me various opportunities, itineraries or events or maybe, [...] groups of people [...] I may connect with." (MB70F)).

The task of editing the interests in the profile page raised certain issues (Table 1). In particular, 3 participants did not recognize the icon (plus) to add interest(s). A participant reported: "I thought that clicking on the plus it was like put "I like" on any of these [interests already on the page]... The fact that there was written "I like" confused me, I would have preferred "Add" or "My interests" (AD69F). Another participant reported that: "I would make the symbols more intuitive. For example the plus. If you don't know what it means.. then once you understand you know it, but if you have to face it alone..." (AC67F). This implies the importance of providing training support or assistance to older adults when introducing new system. Overall, the interest page was perceived as clear. ("No no [I wouldn't change anything] I would say it's essential but indispensable." (FF67M)).

T3 - Upcoming events
This feature was perceived as useful by the participants, mainly because "it works like a reminder [...] like a memento." (VM65F) or, as another participant mentioned: "The view is simple. You go step by step. It is better than to have all [the events] put together." (MC73M). All participants completed the task successfully (Table 1). Recycle bin symbol was recognized by a participant unlike at the previous task ("Always the bin! Now I've identified it!" (VM65F)).

Calendar

Overall feature experience
The Calendar feature was familiar to the participants since they had previous experience with similar systems, such as Facebook, websites that inform about the events in certain area, smartphone calendars, or Google calendar. In general, the participants expected to use the feature "like an agenda." (RB68F), in which they could find "the events in chronological order." (MB69F), search for events "I search for the days and I expect that it shows me everything that happens" (AC67F)), and be informed in an efficient way "because instead of searching on newspapers […] there is everything gathered here, it's time saving." (VM65F).

The participants were comfortable with the name of the feature. However, some of them suggested alternatives such as "Calendar of appointments" (SB70M); "Possibilities" (CS66F); "Maybe "Appointments" more than "Calendar", because they are events you cannot miss, recommended events, that it's better to be informed about" (FF67M); "The word "Events" has to be [in the label] or "Proposals" (MC73M).

9 participants highlighted that the existing icon does not evoke a calendar, and that without the text it would not have been recognizable ("It's not so immediate. It looks like a car battery." (FF67M); "Is this icon a camera or a tablet? It's not clear"

(RZ71M); "*I don't like the icon, it seems a tram!*" (SB70M); "*make it more like a calendar with days and numbers […].*" (CS66F).

Overall, the feature was considered useful as an efficient way to plan and organize one's activities: "*I believe that it's useful because usually I write it on my agenda, on paper calendar, but sometimes it's useful also to have it organized like this […] it's more convenient.*" (CS66F). "*It gives you or reminds you all the information for getting to the event and then it allows you also to share [the event] and invite someone... it's something more.*" (FF67M). "*[...] you can customize it in the following. You can put the events that you like the most, modify, so I believe it's well-structured*" (VM65F). "*[...] it helps me to organize.*" (MB70F).

Table 2. Task completion description for Calendar feature.

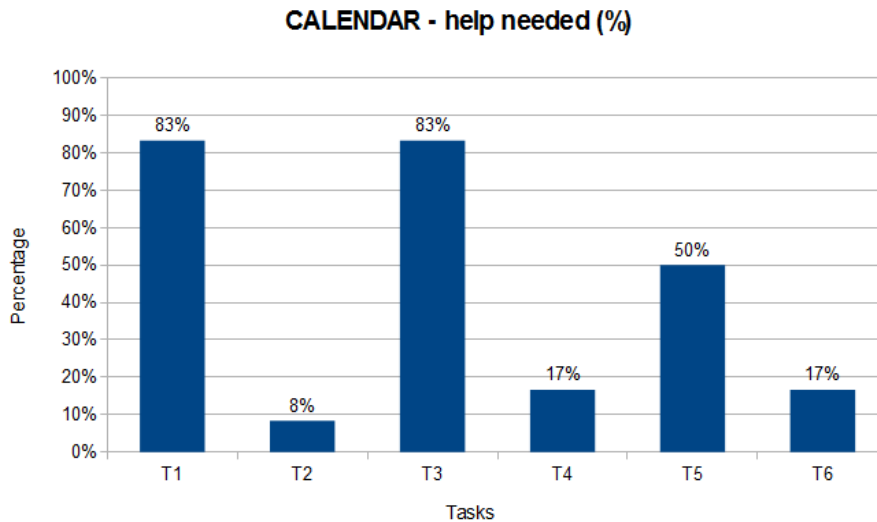| Task	No. of subtasks	Subtask	Help needed	Description
T1 - Edit upcoming events	12	Navigation icon	8	Existing icon not recognized (associates with roof or curtain), participants indicated that using the marker symbol would make it clear
		Invite to event icon	3	
		Delete event icon	2	
		Details button	2	
T2 – Event search	2	Search text field	1	
		Search icon	1	
T3 – Create event	16	Create icon (new page)	7	Icon with plus sign was not associated with this purpose, participants suggested using a text button
		Title field	6	Not recognized and mixed with description field
		Confirm	1	
T4 – Personal achievements (garden)	13	Achivements button	1	
		Goals check box	1	
		Message text field	1	
T5 – Past events	15	Upload photo icon	6	Not recognized, participants suggested camera icon with plus sign
		Past events button	1	
		Photo album icon	1	
		Comment text field	1	
T6 – Events suggestion	6	Suggestions button	2	

CALENDAR - help needed (%)

Figure 44. Calendar – task completion overview.

T1 - Edit upcoming events

In certain aspects, this task was facilitated based on knowledge transfer from previous tasks. A participant pointed out: "*It's always the pencil... once you understand the pencil [meaning] it's OK.*" (SB70M). 8 participants didn't recognize the navigation icon that displays the page with directions and transport information for the event (Table 2). This is an example of the metaphor problem. Even though it was intended to represent an open map, 8 participants misunderstood it and were not able to identify it as the correct one. The participants reported that "*It is not clear that it's a map... it seems an open book, a curtain.*" (MC73M); "*This [symbol] I don't know it. It looks like roofs*" (AP71M); "*[...] you realize that it's a map [...] only because there is written where it is [he means that it is near the information about the location]*" (FF67M). Participants suggested to use the pin icon which they were more familiar with: "*If in place of this [map icon] there was this icon [the pin] [it would have been more understandable]. Sometimes this [pin icon above Trento] indicates... for association I'd click on it [...]. I'm used to see this icon [pin]*" (CS66F).

The navigation page was found useful by participants because: "*It gives you the information of place and time that allows you to reach the event location in the most efficient way [...] there is the itinerary, the travelling times, the weather.*" (FF67M). The content of the page was perceived to be clear, as 2 participants highlighted: "*The page is very good. It's the classic [view]: the map and the small man [icon]. It's intuitive because it's already known.*" (SB70M); "*The symbols are those usually used on maps, so it's familiar to me.*" (MB69F).

The participants found the feature that allows to see and change an event's details useful. For instance, a participant stated: "*This is very interesting. I like it very much for the fact that maybe I can rename in a way that is clearer to me, even the time and date. I like it!*" (AD69F). However, 4 participants expressed doubts in having the possibility to modify event details, since this may affect other people. A participant stated: "*It's useful if it affects myself. It would be detrimental if it would modify the view for anyone. I don't think it's necessary.*" (AP71M). The content of the page that displays details for the specific event was perceived as clear and with all the relevant information.

T2 - Search events

As shown in Figure 43, the task was completed successfully by 11 participants. This can be explained by the fact that the feature follows standard search engines (the combination of the text field and the magnifier icon) used by the participants. The possibility to search for an event was found useful by the interviewees. A participant highlighted: "*[...] if you search for an event and you only have one word in order to recall it, it's useful*" (AC67F). Another participant pointed out: "*It's a much more focused search compared with the one that I can do with a search engine. [...] I find it convenient and immediate*" (FF67M).

T3 - Create event

The participants did not have previous experience in using similar feature. The main issue related to this task was to create an event. In particular, 7 participants did not associate the plus icon with this purpose (Table 2). 2 participants selected the icon by elimination. This again implies to metaphor problem. 4 participants suggested button with the "Create event" text. 3 participants found the icon clear: "*the plus means always "add something", it's a clear language.*" (FF67M); "*[...] after you see it for the first time, you know that it means to create something new and so it's OK*" (RZ71M).

After entering creation mode, 6 participants tried to insert the title of the event in the description field (Table 2). The 6 participants reported that they were attracted by different background color since the field for entering the title was on the yellow page header: "*The white field attracted me*" (AD69F); "*I was attracted by the other field [description field] for the colour probably I didn't identify it*" (VM65F); "*The yellow bar probably made me... I thought it was part of the structure. Given the fact that these [other fields] are in a grey environment, I'd have put even this [title field] in this grey environment.*" (AP71M). Thus, it implies the aesthetics problem (Hartmann et al., 2008). The remaining subtasks were completed successfully.

The procedure to create an event was clear and did not raised any issues among the participants. Overall, the feature was perceived as useful for self-organization ("*because it helps to create a personal agenda of events of interest*" (FF67M)), and organizing with other people, as participant highlighted: "*If someone organizes something he/she can automatically invite the others and tell them the agenda and everything*" (MB70F). 3 participants recognized the feature as useful, but mentioned that they would not use it as it is not part of their routine. "*Yes, it can be useful for people younger than me.*" (AC67F); "*Sincerely for me it's not important since I haven't used it until now and if I have to invite people somewhere I call her/him. […]*" (CS66F); "*Probably in a logic that is not mine, but I believe it's useful to [...] give all the information in a simple and clear way*" (VM65F).

T4 - Personal achievements

10 participants completed all subtasks successfully (Table 2). 5 participants used similar features to monitor their progress, mainly for language courses or physical activity. 7 participants liked the idea of seeing their progress as a growing garden. The participant's impressions were as follows: "*[...] it's clear because it's an immediate language of images, and furthermore images that are captivating: a growing garden, many flowers and butterflies that represent the itinerary.*" (FF67M). "*[I like the garden] very much because it is intuitive at first sight, it's coloured, it's*

happy. I like the idea of the flowers and butterflies because it is happy." (AD69F). "*It's better visible than a diagram. The diagram, you have to understand it first. This is immediate: I count the butterflies.*" (SB70M). "*The garden is enjoyable. It lightens [the view]."* (CS66F). *"[The garden] is beautiful and immediate like the image, more than words"* (VM65F). The impressions above demonstrate aesthetic and attractive roles (Hartmann et al., 2008) of the garden metaphor.

3 participants preferred different forms of presentation, such as diagrams and figures, instead or in combination with the garden: "*No [I don't like the garden], not necessarily. To me 80% it's enough... I prefer figures. I wouldn't remove it, it doesn't annoy me, but I don't see it as necessary, particularly useful.*" (AC67F). "*Sincerely I would prefer much more [...] a mathematical diagram. For me it would be much more intuitive a diagram... also this is a diagram but I'd prefer something more stylised. I'd remove the garden... even if it's nice, it's not clear enough to me.*" (AP71M). "*I will be more basic let's say. [I would prefer] A more linear thing... like a diagram, a bar.*" (MB69F).

2 participants stressed the importance of making progress information more visible in the current view. "*The garden, I'd need to see it... I mean, if it gives me the idea [of progress]... if it's just an aesthetics issue and it tells me nothing maybe it's not enough. The increase [in flowers and butterflies] needs to make me understand how much I improved … Does [the garden] represents these percentages, or...? If it only has to give me the idea that I'm progressing it's OK, it tightens and I understand, I see it.*" (MC73M). "*I'm indifferent [about the garden]. It doesn't tell me anything. I cannot understand: what are you improving? The use of this social network?*" (RZ71M).

In general, the page was perceived as clear. A participant reported: "*No, it's OK [I wouldn't change anything] also because there is the legend: butterflies for the distance, flowers for the time. It's clear and nice.*" (FF67M). Another participant suggested to have more precise progress information: "*For the distance and the time I'd put more precise data in place of the percentage: how much distance and how much time. I'd add more info.*" (CS66F). This shows positive results in terms of content and usability (Hartmann et al., 2008).

The possibility to compare with people they know, and exchange comments was preferred by some participants as a possibility to communicate with people they knew: "*It's a way like another to communicate.*" (AC67F). "*[it is useful] because if people want to talk with each other...*" (AP71M). Furthermore, some participants saw comparisons as incentives: "*Yes, yes, it can be an incentive. It is possible to make comparisons.*" (MB69F). "*Yes, I believe it could be fun in some aspects, also stimulating the comparison with others: I work harder.*" (VM65F). 3 participants highlighted that feature's usefulness depends on whether an activity is done individually, and on the level of relations with other people: "*[...] if it's something that I do alone I don't care. Only if I do something with others it's interesting and nice.*" (AD69F). "*I'm not very interested in it. I don't know maybe someone can be interested. For someone can be an incentive to work harder [...]. But it's not very interesting to me.*" (CS66F). "*Given my way of considering the relationships this makes it difficult to use or better I cannot easily understand its real usefulness.*" (FF67M).

Regarding content and presentation, the comparison page was perceived as clear to the participants. A participant suggested: *"I don't like this drawing very much [the butterflies], I would put something more stylized... small balls."* (MB69F).

T5 - Past events
In general, the feature was perceived as clear regarding content and presentation. However, the subtask that created confusion was the *upload photos* icon in the album page (Table 2). 6 participants didn't recognize the icon, whereas 6 participants chose the icon by elimination. This implies a metaphor problem: the box symbol with up arrow was not associated with the upload activity. The participants suggested camera icon with plus sign: "*I would put a camera with a plus.*" (AD69F); "*Maybe [there should be] the camera icon.*" (MC73M); "*I would stay with the camera or something similar […].*" (VM65F).

Participants did not have previous experience with similar features. Central part of this feature was photo album whose benefits were perceived along three lines.

Firstly, the feature was considered useful as reminiscence utility: "*[it is useful] for the memory first of all […] to remember the friends that participated in it. To have information that you forgot, even from friends since it's possible to chat.*" (AD69F). "*It's very useful. Maybe when you want to verify something you forgot or have a confirmation.*" (MB70F). "*because maybe you can find something you missed*" (MB69F). *"[...] you can live again how the event was for you and also your friends.*" (AD69F).

Secondly, it was perceived as a sharing utility: "*[...] in the sense that photography it's a form of communication, a language, [...] so it's useful to insert a picture because it's anyway a personal point of view […].*" (FF67M). "*[...] maybe each person from the group had different perspective, different images, different images so the sharing is useful for sure.*" (VM65F). "*I like it. [It's useful] to share. Because maybe you liked [an event] and someone else may like it too.*" (SB70M).

Thirdly, the participants saw the feature as a personal agenda or diary: "*it works like a photo album, like an address book […] here it is all concentrated in one tool […].*" (VM65F). "*[...] it's like writing on an agenda.*" (FF67M); "*[...] it's like to leaf through a photo album*" (RB68F). "*[It's] a kind of archive let's say.*" (MC73M). "*the idea about where I spend my time... let's say statistically how much time I devote to a certain activity, maybe excluding others.*" (CS66F).

The possibility to rate the activity was appreciated by the participants: "*[...] you can compare with others, have an idea of the appreciation of something, like with hotels.*" (MB69F). "*[The rating] may be useful in case they propose [the event] again... in order to see how it went the last time… I mean: if it has been appreciated or not.*" (AC67F).

2 participants were cautious about sharing information about their past activities with other people: *"I don't think that a person has to always share her/his pictures of what she/he does or not. You can send a picture to your friends, but not in this form [with a] social network."* (AC67F). "*Personally, I don't like all these sharing of comments […] it's excessive sometimes […]. It's not so essential in my opinion. Even uploading picture […]. I'd limit [this feature] very much. I'd insert it [in the system] only on demand."* (CS66F).

T6 - Events suggestion

3 participants had previous experience with similar features. A participant reported: "*I see a 1 here. It means that there is a new one [event]?*" (MB70F).

The participants perceived the feature useful to be informed about the events they may prefer and decide whether to accept recommendations. "*Yes, yes, it's useful because maybe you missed something.*" (MB69F). "*It's a continuous update of the events that exist. I like it.*" (SB70M). "*I can create my own calendar as I like in some sense...*" (RZ71M). "*In this way you are up-to-date with the proposals that exist. Then, a person is free to accept or not, but at least you know it.*" (CS66F). "*[...] I do the selection, with "refuse" and "accept", but being informed is useful and it's also time saving compared with the thousands of other tools that exist.*" (VM65F). "*I can decide whether I'm interested or not. It's up to me to accept it [the suggestion] or refuse it [....] I prefer to be kept informed then to decide.*" (MB70F). 1 participant understood suggestions as: "*[...] I imagine that [the suggestion] is sent by people that know my passions, my interests... by friends that know me and that invite me.*" (AD69F). "*These are things that may be interesting... to know... then you can decide whether it is interesting or not [the event].*" (RB68F).

The content and presentation were clear to the participants (Table 2). "*It's concise, nice. Few things, but very detailed.*" (SB70M). A participant suggested price to be included in recommendation "*[...] the price [of the event]. The tickets. Nowadays there are always price indications.*" (MC73M).

Groups

Overall feature experience

6 participants had previous experience with online user groups, such Facebook, WhatsApp, LinkedIn, and Google groups. The participants agreed on using the label "*Groups*" to name the feature. A participant reported: "*It's understandable, in the sense it is a plurality of people […].*" (FF67M). One participant suggested using "*Groups of Interests*" (CS66F). The group icon was clear and intuitive to all the participants.

The feature was considered useful to maintain contact and interact with known people in an efficient way. "*[It is useful] because it stands out immediately the specification, i.e. family members, friends, acquaintances, etc.. It's very simple, easy and also for communicating, for sending messages, to have all listed is a good thing.*" (AD69F). "*Yes, probably [it is useful] also in order to distinguish. I mean, to my family members I communicate certain messages that I don't send to "Professionals". A distinction like this can be surely useful.*" (VM65F). "*It's more immediate without searching for numbers in the address book, because here you've got all the numbers.*" (SB70M). However, a participant would prefer list of contacts: "*I don't think it's useful. A simple list in alphabetical order, like an address book would be better. I'd do a simpler thing, without the grouping. A person may be friend, and also a colleague, a relative, I mean, at the same time, so in what group should I put her/him?*" (AC67F). Another participant would constrain the feature to the specific groups "*I'm used to a direct contact with people with whom I want to participate or [I use] the word of mouth. I'd not consider it essential. [...] I believe that for what it concerns me it may be useful in the family field. Otherwise no.*" (CS66F).

The participants suggested user groups they would like to have. "[…] *keep only "Family members". The rest would be a direct issue: I send an e-mail, make a call, or send a message. I'd remove the others [...].*" (CS66F). "*Usually the Friends group nowadays include anyone except for family members. [...] also in Facebook everybody is Friends even if actually they are only acquaintances or colleagues. Beside "Family" it would be enough to have "Friends".*" (MB69F). "*New [contacts] are missing. […] But I know her/him when she/he becomes a contact […]. I raise the question: where should I put her/him? [...]. Maybe I'd add the category "Others".*" (MC73M). "*I would like to have the possibility to potentially add group types, or to change them if one doesn't interest me [...] I should be able to choose the groups and add or delete them.*" (MB70F). "*I'd like to have the possibility to have not only fixed [groups], but also for me based on my interests.*" (SB70M).

The *"Professionals"* group, intended to represent doctors and carers, was interpreted differently among the participants: "*I don't understand very well "Professionals". Given the purpose of the system, this [page] should be referred to all the people to whom I am interested in, in order to participate in events of various kind. Then Professionals... a professional can be of story, art... or swimming.*" (AP71M). "*If with Professionals you mean people that may be interested [in the event] for a professional interest it's OK. I mean, it's not so appropriated [the term] from my point of view, because... professionals in the sense of professionally interested? I don't know if the term is correct in Italian: because it could mean lawyer, plumber...*" (FF67M). "*Professionals is interesting. To be in contact with the doctor, maybe to have the addresses of the diverse professionals that interest you, the doctor, the lawyer: it's useful.*" (RB68F). "*Professionals, then it's possible to specify depending on one's own activity.*" (VM65F). These interpretations may be explained with the fact that our participants were independently-living older adults with interests and activities and therefore considered the group more broadly than including merely medical staff.

The observations above are correlated with individual life circumstances of the participants regarding social interactions. Thus, it implies the need to have customizability (Hartmann et al., 2008): the possibility of customizing user groups according to user life circumstances and preferences.

Table 3. Task completion description for Groups feature.

Task	No. ofsubtasks	Subtask	Help needed	Description
T1 – Edit user groups	14	Message icon	4	In this case, they would first choose the people they want to send the message to
		Add user icon (group details view)	1	
		Message the group subject field	1	
T2 – Recommendations of users to join the group	6	Recommendation icon	5	Palm with the person not associated with the purpose for some participants
		Person icon	1	
T3 – Chat with	4	Chat icon	10	Participants

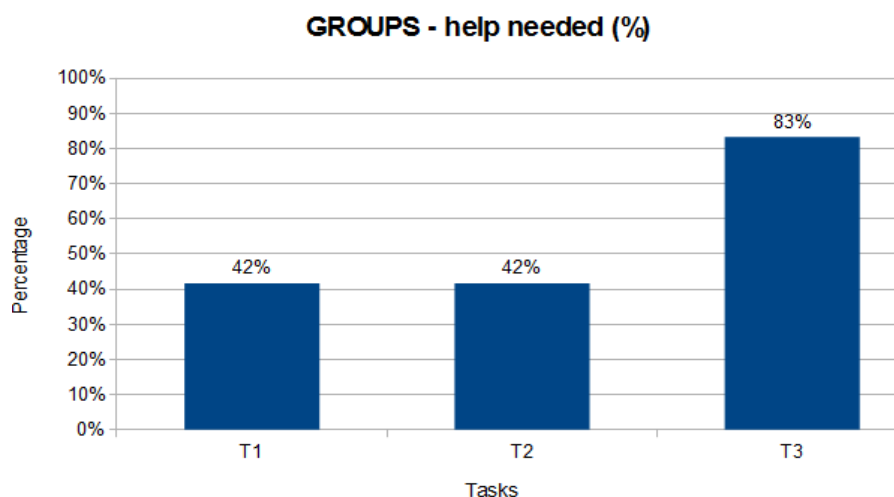| Task	No. ofsubtasks	Subtask	Help needed	Description
people you know				suggested to add text "chat" to the icon
		User invitation text field	2	

Figure 45. Groups – task completion overview.

T1 - Edit user group

The subtask that caused misunderstanding was sending a message to a specific group (Table 3). 4 participants would first have selected the group (clicking on the corresponding icon), or the specific person whom they wish to message, and after they would press the envelope icon to write the message. In addition, instead of writing to a group, they would to exclude contact(s) from the communication: "*What if I want to exclude one of these [friends]? [clicking on the friends icon] I thought to access the list with all my Friends and then to select the one I'm looking for [...].*" (MB70F). "*I would first [select] the person and then what I want to do. Because maybe at that time he/she is not interested.*" (SB70M). Thus, it implies a usability problem (Hartmann et al., 2008).

The view showing contact information and the page for writing a message were clear and familiar to the participants: *These [in the message page] are all symbols that I know and for me it becomes immediate. The more symbols are standardized, the more it's easier.*" (AP71M). "*It's clear like the e-mail, [...] it's simple for messaging.*" (MC73M).

T2 - User recommendation

5 participants had previous experience with similar features (3 using Facebook, 2 using LinkedIn). All participants found the feature useful to make new contacts: "*Yes, it's useful in order to enlarge the Friends circle a little bit.*" (MB69F). "*It could be useful because the system combines the data [about me and about others] and for me it could be interesting [some suggestion].*" (AP71M). "*It is useful to connect with other people and exchange ideas. I would have to decide [to add them to my contacts or not].*" (RB68F). "*Because if you use this tool [the social network] you have to keep it alive, otherwise it's useless. It's like having an agenda and writing two*

names [in it] and for the others saying *"I'll remember them."* (FF67M). *"[I expect] that the system will make me suggestions based on my data and what it knows about the others. The system combines the data and then suggests."* (AP71M).

2 participants appreciated the possibility to decide on recommendation (accept or reject): *"It may also be useful. I've never thought about it. In the end I can always refuse them if I don't want, I mean not accessing the feature."* (CS66F). *"Within certain limits [it can be useful]. I mean, it depends on how many suggestions it gives. I trust more a suggestion that comes from friends […]. But within certain limits it may be useful."* (VM65F).

5 participants did not recognize the icon used for accessing the recommendation page (er groups according to user life circumstances and preferences.

Table 3). 3 participants chose the correct icon by elimination. This implies the metaphor problem: the symbol of the open hand with a person on its palm was not associated with recommendation of new people. 4 participants found the icon clear: *"Yes [the icon] is understandable"* (AD69F). *"[...] the hand is good in the sense of accepting."* (CS66F). *"The hand [icon]. It's understandable."* (FF67M). *"Yes, the icon is clear"* (MB70F).

T3 - Chat

10 participants had used similar features. 10 participants did not choose the correct icon to enter chat page (Table 3). 2 participants chose the correct icon: one recognized it, other did it by elimination. This implies the metaphor problem: icon with bubbles was not associated with chat purpose. Once the correct icon was shown to the participants that failed, three of them agreed on it (*"[...] once they explain [the icon] to you it's more evident... looking more carefully there are two cartoon bubble."* (CS66F); *"I hadn't observed it carefully, because it's actually the icon of the chat. No no, it's clear."* (FF67M). 4 participants suggested to add text (such as "Chat") to the icon.

The participants found the feature useful as a mean for instant communication: *"The chat feature is always useful because it is immediate."* (AP71M). *"It's useful because it's a tool that allows you a real-time communication alternative to others, the phone."* (FF67M). *"It is useful because "there is an immediate contact."* (MB69F). *"Many people use [this feature] because it is useful."* (RB68F). *"Sure it is [useful]. No [I wouldn't change anything]. It's very good. It's how I expect it."* (AD69F). *"Yes, as I said before in this perspective of a diverse communication I believe it is very useful."* (VM65F).

However, 2 participants expressed certain scepticism towards this kind of communication: *"Nowadays it's a fashion, but I'm not into it. I've never used it"* (SB70M). *"I was used to phone calls to say tomorrow we meet in that place at that time, stop. Given the fact that […] now it is free it could become redundant"* (CS66F).

3 participants preferred to choose the person icon, instead of inserting the name of the person to invite to chat.

Messaging

Overall feature experience

The messaging feature was evaluated with 10 participants. Overall, the feature was considered clear and sub-tasks were accomplished autonomously (Table 4) since 9 participants had been using similar features, such as e-mail.

Table 4. Task completion description for Messaging feature.

Task	No. of subtasks	Subtask	Help needed	Description
T1 – Read a message	1	Read message	1	
T2 – Write a message	6	Compose message icon	3	Participants would choose the contact and then enter writing mode
T3 – Reply to a message	3	-	0	
T4 – Find a message	1	Find message (text field + icon)	2	
T5 – Delete a message	1	-	0	
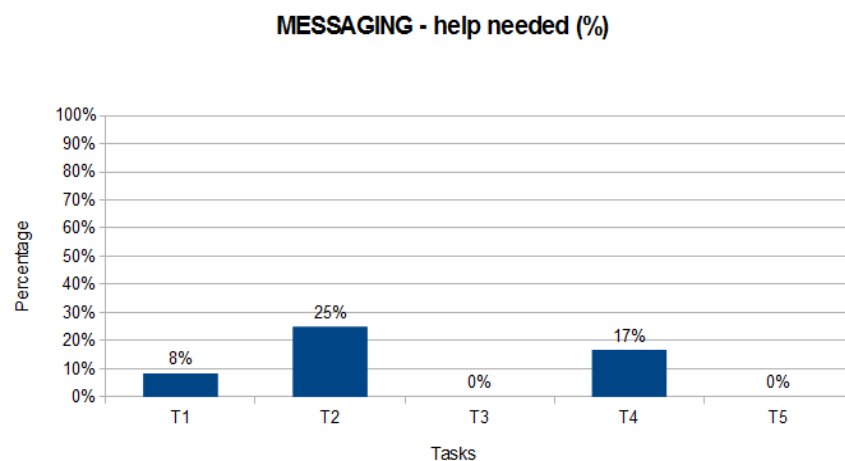
Figure 46. Messaging – task completion overview.

The label and the icon used for the feature were clear to the participants: "*It seems to me that nowadays we're used to it. We've used these terms for a while, so it's OK. [That icon] is already mentally assimilated.*" (VM65F). "*The icon is clear and it's part of the already well-known icons.*" (FF67M). "*The icon is good*" (MB70F).

The feature was found very useful by all the participants as a standard means to communicate using technology: "*[...] it's an immediate tool to instantly visualize a conversation.*" (FF67M). "*I find it useful because it's very convenient. I already have all the people, with addresses I guess... so it is very useful, practical, with the people I inserted in my [contacts].*" (AD69F). "*The feature is useful "for the same reason of the chat".*" (AP71M). "*[The feature] is simple.*" (SB70M).

Messaging Tasks

3 participants did not choose the icon to enter the view for writing messages. Instead, the participants would have searched for person's address and then write the message: "*I would search for the person and then compose the message [...] it would be easier for me. Or [I would like] to have both option: searching for the message to reply, or the person.*" (MB70F). "*I would first search for [the addressee]. If she/he is not among the people [here in my messages]...*" (VM65F). However, once explained, the participants agreed that the compose icon is clear: "*I don't know why the pen*

[icon] is the most common, I cannot keep it in mind and it should be the first [that comes to my mind]." (VM65F). Thus, it implies a usability problem: the procedure for writing new message was not intuitive to the participants.

The pages for replying to and writing new message were clear and simple to the participants: "*The page is clear. It's like that of the e-mail.*" (MC73M). "*The icons are very good*" (AD69F). "*The page is very clear*" (CS66F). "*The icons [in the new message page] are clear.*" (MB69F).

The participants found search feature clear and useful: "*[I can search] a content or the name of the person. Yes, yes, it's useful.*" (FF67M). "*Yes, it's clear and simple. Yes, it is useful because many times you don't have the time to see... and if you open this [page] you can search for messages that you couldn't read*" (RB68F). "*It works like on other sites so... it's a good way [to find messages].*" (AP71M).

Navigation

The navigation feature was clear and useful to all participants. All tasks were carried out autonomously and successfully.

In particular, the topbar was found useful by the participants mainly for efficient navigation among main features: "*Because it's immediate. […] There is everything that you need at any moment*" (AD69F). "*Because it highlights [the commands]. It's the tool bar [...]. It's like a menu of the things you have available.*" (FF67M). "*It's convenient in order to be faster.*" (SB70M). "*[the top bar] is clear. It is useful because you can go back and search for anything from here.*" (MB69F). "*The top bar "is very useful because it makes life easier. You can go directly to the specific issue.*" (MB70F)

The only suggestion made by the participants was to have more clear icon for the calendar, which was the same comment as when evaluating the Calendar feature. The participants highlighted: "*I'd make the calendar [icon] clearer. It doesn't look like a calendar*" (AC67F). "*[...] only because you already told me, but it doesn't look like a calendar*" (MB70F). A participant suggested to add the text below icons: "*I'd leave the icons, so that maybe you memorize them, but I'd write "Profile", "Calendar", etc.*" (RZ71M).

The menu feature was seen useful and convenient in combination with the toolbar: "*because it makes all the steps faster.*" (MC73M). "*[...] it gives you further information that not necessarily need to be highlighted in the toolbar, that otherwise would be more difficult to read.*" (FF67M). "*it's necessary because if I'm in trouble I can go there for anything. In case you can restart [the system].*" (MB70F).

In general, the menu was appreciated for its simplicity, items and arrangement: "*The menu is not complicated, it's very simple.*" (CS66F). "*It's good with "Home" at the top and "Log out" at the end.*" (AD69F). "*On many websites I can't find how to exit. Here it's very clear.*" (MB70F). 2 participants suggested using Italian labels for menu items: "*Not everyone understands English. I would have preferred them in Italian. Then, by constantly hearing [these terms] you memorize them.*" (RB68F). "*I'm always annoyed when it's used English and Italian together. Choose one of them! So put "Help", "Log Out" [in English]*" (RZ71M).

Conclusion

Based on the results of the evaluation, a list of changes was created (Table 5) and implemented as the latest version of the mockup (described in section 4 - FriTab UI design).

Table 5. List of FriTab mockup changes.

Feature	Old	New	Reason
Authentication –> Progress (Garden)	Continue text + arrow icon (to proceed to the Home page)	Continue text	Participants did it correctly in the end, but indicated that they would click on the text instead of the arrow (N=6)
Profile -> Edit personal data	Pencil to edit personal data( )	Link on photo and name to enter edit mode; pencil removed	N=9 participants did not spot this icon and indicated that they would click either photo or name
Events -> Calendar Icon			Many participants (although completed the task using the icon) indicated that it doesn't actually resemble calendar
Events -> Navigation icon	Icon of folded map ( )	Icon with the marker on top of a flat map ( )	N=8 participants did not recognize this icon, the presence of marker sign to associate with navigation is mentioned by N=6
Events -> Create event	Create icon (circle with plus)	Button ("Create event")	N=7 participants did not recognize the icon, instead proposed to have a button with text
Events -> History -> Photo album	Upload photo icon ( )	New icon ( )	N=6 participants did not recognize the icon, some suggested new one as camera with plus
Events -> Create event	Text field to insert event title at page header	Field removed	N=6 users did not recognize the field immediately, some suggested that having "Description" field is enough and these two fields means the same (duplicate)
Groups -> Chat	Chat icon	Chat icon + text (Chat)	N=10 had troubles to recognize the icon, some did it by elimination process and suggested to add text "Chat" below the icon
Messages -> Write message			N=3 users didn't recognize the icon
Events -> Achievements (Progress information); Login -> Garden	Garden with circular progress information in %	Addition of numerical values for time and distance; Diagramatic view showing results for specific time period (link from circular progres bar, text, value, icon)	Some participants (N=4) would also like to see presentation in the form of numerical values/diagrams in combination with the garden

7. Maximising trust on the social network via user interfaces

While the previous section focused on developing a usable UI for older adults, the current section addresses one particular challenge: facilitating and increasing trust among users – trust in both other users (to encourage meeting up) and trust in the system (to encourage the acceptance of recommendations). Past research has highlighted that trust is a significant predictor to an older adult's intention to use social networking sites (SNSs). This section aims to qualitatively assess how older adults make trust judgements of social networking sites and their users, as well as identifying trust barriers associated with older adults using the ACANTO social networking site. 10 purposefully sampled participants from the UK, over the age of 65, were interviewed using semi-structured interviews. The data was analysed using thematic analysis. 4 main themes were identified; Understanding motivations, control, credibility validation and similarities. Participants associated trust in social networking sites with issues related to control of personal information and with validation through credible site ownership or recommendations from family or friends. Trust in other users of SNS was related to understanding motives for making contact on a social networking site and by assessing how similar an individual was to themselves. Implications of the findings in relation to user interfaces for the ACANTO system are discussed.

Context of the study

The number of older adults using social networking sites (SNS) in the United Kingdom (UK) is slowly increasing, with the number of Facebook users over the age of 65 rising from 2 million in 2014 to 2.4 million in 2017 (Statista, 2017). However, the latest estimate put the number of adults over the age of 65 in the UK at 11.6 million (Office for National Statistics, 2016), highlighting the poor uptake of social networking sites in the older adult population. This is of particular concern to researchers, given that research has highlighted numerous social benefits to participating in online social networking for older adults (Gatto & Tak, 2008; Nef, Ganea, Müri, & Mosimann, 2013; Sum, Mathews, Hughes, & Campbell, 2008). Therefore, it is important to investigate the barriers which prevent older adult's intention to use online SNS in order to provide suggestions which can improve the uptake of SNS in the older adult population.

Trust and social networking sites

Braun (2013) highlighted that one of the main predictors of an older adult's intention to use online SNS is trust. Trust is a complicated construct, studied in multiple disciplines and consisting of numerous properties (Sherchan, Nepal, & Paris, 2013). However, it is generally accepted that trust is needed in situations of risk (Zulman, Kirch, Zheng, & An, 2011) and revolves around an individual's acceptance of vulnerability with the expectation that they will endure no harm (Corritore, Kracher, & Wiedenbeck, 2003). Online trust is even more complex in nature, with the addition that an individual must also trust the technology and site when trusting online (Boyd, 2003). In addition, when trusting a website there is also a need to provide structural assurances in relation to security and privacy on the site (Wang & Emurian, 2005).

Much of the research into trust and online SNS has focused on computational models which aim to calculate trust between users of a SNS. For example, researchers have put forward trust models based upon a combination of the frequency of communication between members and the frequency of which an individual uses information posted by another individual on the site, known as propagative trust (Adali et al., 2010; Zuo, Hu, & O'Keefe, 2009). However, the issue with these models is that trust is both subjective and asymmetrical (Sherchan et al., 2013). This means that two individuals could communicate equally and belong to the same network of friends but could report differing levels of trust in each other. Therefore, further research is needed to assess how an individual makes trust judgements of another user on an online SNS.

Moreover, when building trust in an online environment, individuals must also trust the site they choose to use (Boyd, 2003). Whilst there has been some research highlighting links between privacy policies and trust in SNS (Krasnova, Spiekermann, Koroleva, & Hildebrand, 2010; Tucker, 2014), there is a lack of research into the factors which affect trust in a SNS. Research from the e-health domain has shown that design features such as pop up adverts and a poor site name led to mistrust in a website, whereas content features such as informative content and the use of simple language promoted trust in a site (Sillence, Briggs, Fishwick, & Harris, 2004). Similarly, research from the e-commerce literature has suggested factors such as graphical design, structural design, content design and social-cue design contribute towards building trust in a website (Wang & Emurian, 2005). Placed together, these findings highlight how trust in a site can be directly impacted by the design and features of the site. However, the functional use of an e-health or e-commerce site is largely different to that of a SNS. Whereas the focus of an e-health or e-commerce site is to search for information or a product to purchase, the primary focus of SNS is to build and maintain relationships. Therefore, further research is needed to assess whether the design and features of a SNS impacts upon users' level of trust in that SNS.

Older adults and trust

However, there is also a concern that older adults are impaired in their ability to make successful trust judgements. In particular, Castle et al (2012) found that older adults performed poorly in comparison to their younger counterparts when asked to judge the trustworthiness of faces high in untrustworthy features. Although this study was based within an offline setting, it does cast doubt over an older adult's ability to successfully judge the trustworthiness of another individual on a SNS based upon the images they upload to the site. In addition, older adults have been found to be less sensitive to credibility cues in website features and message content, possibly due to their tendency to passively accept information online (Liao & Fu, 2014). Possible explanations for why older adults are poor at judging trust range from declining neural systems with age (Castle et al., 2012) to a social explanation whereby older adults focus on improving emotional well-being and relationships by choosing to attend to positive information and ignoring negative information (Bond & Depaulo, 2006). Whilst there is no universally accepted explanation as to why older adults are poor at making trust judgements, it does bring into question how older adults judge trust in SNS and their users.

Focus of the section

SNSs can hold social benefits for older adult users but there are barriers to their use. Trust has been highlighted as one of the main barriers for older adults using SNS (Braun, 2013), however there is a lack of research looking into how trust is built in a SNS. Moreover, research has highlighted how older adults are poor at judging trust in both offline and online environments (Castle et al., 2012; Liao & Fu, 2014). So, the current study is aiming to assess how older adults make trust judgements of SNS and their users. The current study also aims to evaluate the trust barriers associated with older adults using a proposed SNS which is specifically for older adults, with the intention of informing the development of the site to alleviate such worries. The research question under investigation was 'How do older adults assess trust in social networking sites and their users'?

Method

Approach

The study adopted a qualitative approach, consisting of semi-structured interviews. Thematic analysis (Braun & Clarke, 2006) was carried out upon the transcribed interview data.

Participants

Ten purposefully sampled participants were recruited on the basis of being over 60 years old and having experience of using at least one SNS.

Table 6. Participant demographic information, N=10.

Participant Number	Age	Gender	Social Networking Sites Used
1	78	Female	Facebook
2	67	Female	Facebook, Twitter
3	72	Female	Facebook, Twitter
4	65	Male	Facebook, LinkedIn
5	74	Male	Facebook, LinkedIn, Twitter
6	65	Male	Facebook, Twitter
7	61	Male	Facebook, LinkedIn
8	72	Female	Facebook
9	80	Female	Unnamed Educational SNS
10	81	Male	Facebook

Materials

An interview schedule was used to structure the interview. The interview schedule was split into four main sections: Questions about participant's social media use, questions about features of trust in social networking sites, questions about features of trust in other users of social networking sites and questions about trust in suggestions made by social networking sites. Example questions included 'When

deciding whether to sign up to a social networking site, how important is the look and feel of the site in your decision' and 'Why may other users of social networking sites post information about themselves which is untrue/not trustworthy'? Six mock social media profile pages were used within the interview (see Figure 47 for an example; Appendix 7 for the full list), with one male and one female image from each of the following categories; younger adult, middle aged adult and older adult. Existing mock-ups of the ACANTO social network interface were not used because the focus was not on the details of the UI, but rather key content-elements that would increase or decrease trust. Using high-fidelity prototypes can draw attention away from core elements to more superficial issues (Snyder, 2003, pp. 58–60), and we wanted to avoid this. Furthermore, these interviews were done in parallel with the studies described in previous sections and a full UI was not available. However, a current potential design of the ACANTO SNS was also used within the interview to show participants what information they would see when viewing another user's profile (Figure 48). An audio recording device was used to record the interview.
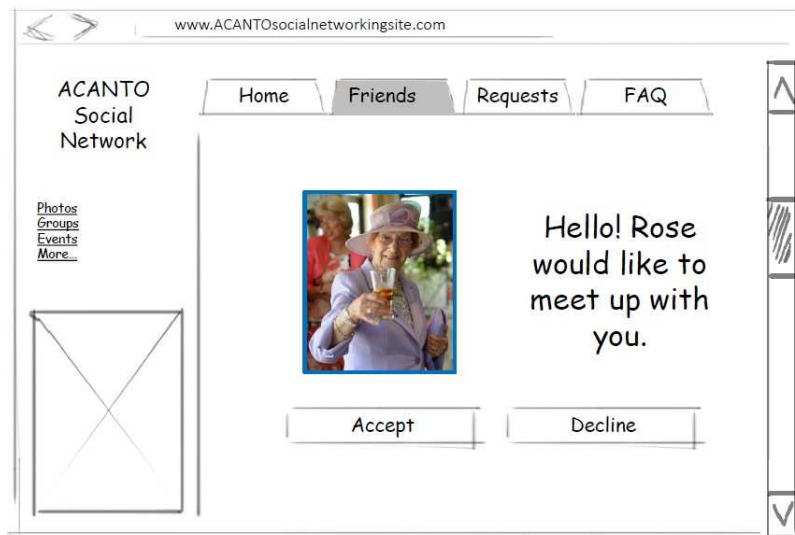

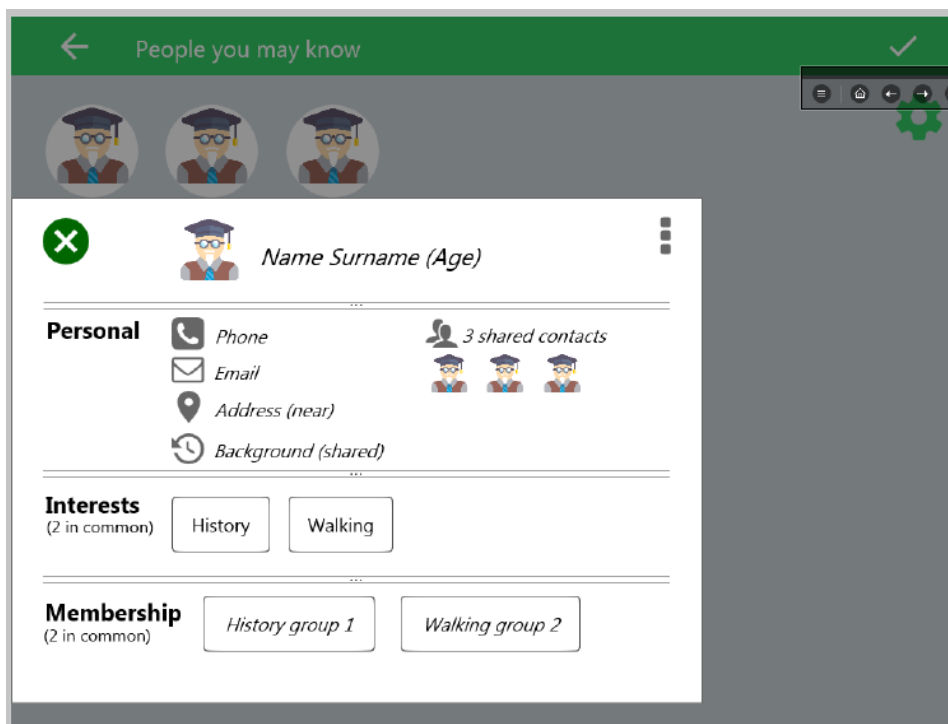**Figure 47: Example mock-up shown to participants to elicit thoughts about meeting with a stranger**

Figure 48: Part of the mock-up used in interviews to show the contact that might be shown to other users

Procedure

Participants were contacted via email and asked whether they would be willing to take part in a study on trust in social media. Upon confirmation that they wanted to take part in the study and met the eligibility criteria, participants were invited to attend an interview. Participants were first asked to read through a participant information sheet. The researcher then explained in further detail the topics which the interview would cover. Participants were given 2 consent forms to sign; an informed consent form agreeing to take part in the study and a consent form allowing for their interview to be recorded and transcribed. The researcher then began to interview the participants using a semi-structured interview guide, which allowed the researcher to further probe any interesting topics that came up during the interviews using follow-up questions. Interview questions included items such as:

- What features of a social networking site would make you distrust the site? (Trust in the social network system)
- How would you be able to tell if someone was being deceitful with the information they provided on a social networking site? (Trust in other users)
- Would you trust a social networking site to use your declared interests to suggest appropriate activities for you carry out in an offline setting? Why/why not? (Trust in recommendations)

Upon completing the first 3 sections of the interview schedule, the researcher then explained the proposed ACANTO social networking site to the participant and began asking questions related to the site. Participants were then shown one of the mock-up profile pages and were asked whether they would be willing to meet up with the individual within the profile in an offline environment, based upon sharing similar interests. If the participant indicated they would meet up with the individual from the mock-up profile, they were asked questions around what would make them feel

comfortable meeting up with that individual. If they indicated they would not meet up with the individual, they were asked questions about the reasons for that decision. Participants were shown between 2 and 4 profiles dependent upon time. Participants were then shown a potential design of the ACANTO social networking site and asked questions about whether the information presented in the design would be useful in helping them make a decision on whether to meet an individual through the site. The participants were then given a debrief sheet and thanked for their participation in the study. The total procedure lasted between 25 minutes and an hour, dependent upon the length of the interview. The study received ethical approval from the Department of Psychology postgraduate ethical committee at Northumbria University.

Procedure for Analysis

Thematic analysis (Braun & Clarke, 2006) was used to analyse the transcribed data. The researcher first started reading through the data and made notes about parts of the transcript that were related to the research question. Initial codes emerged from the data and were grouped together into broader themes. The themes were then reviewed and defined, ensuring that coded extracts fit appropriately within the theme they were placed in. The final report was then produced on the main themes of the analysis. A thematic map was then created with the finalised themes (See Figure 49).
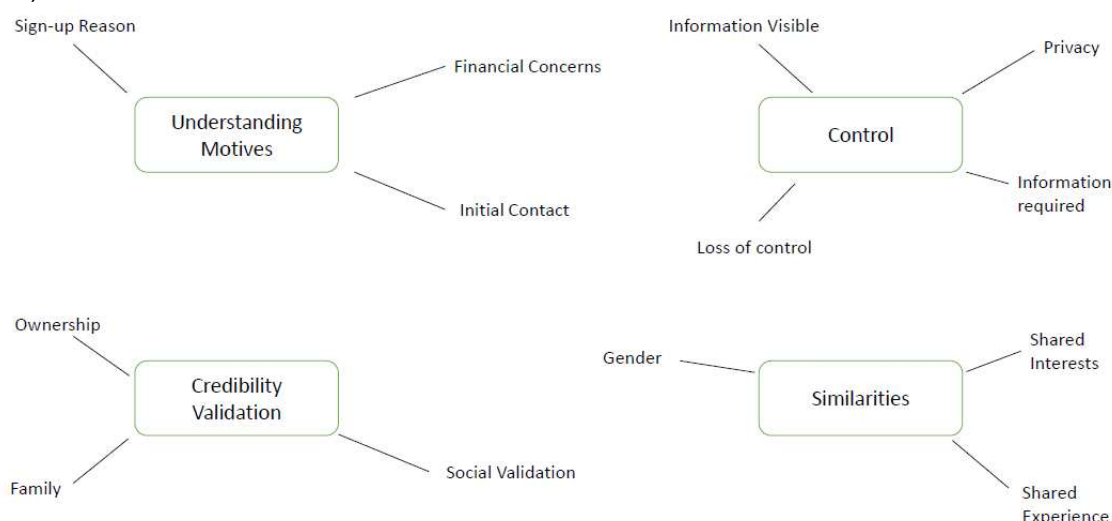

Figure 49. Thematic map of themes observed in interviews.

Throughout the conduction of the study, a reflective passage was kept by the author to record their thoughts and feelings at each stage of the project and to reflect upon the researchers' impact on the project.

Results and Discussion

The research question under investigation was 'How do older adults assess trust in social networking sites and their users'? The main themes discovered were understanding motives, control, credibility validation and similarities.

Understanding Motives (Trust in other users)

A key theme emerged within the transcript that trust in another individual on a SNS was impacted by an understanding of that individual's motives for using the site. In particular, participants discussed how they would be more willing meet up with

individuals they met on a SNS if they understood why that individual chose to sign up to the site or why they wanted to meet up with them specifically.

> *P7: 'those two images are primarily the sort of images I'd expect to see on that site and I'd be slightly surprised to see that image and I would be less likely [to meet up] because I would be enquiring as to his motives for signing up to that site'.*

> *P3: 'so why is he wanting to meet up with me specifically as opposed to other people in the group who are interested in it'?*

This suggests that the participant feels a level of discomfort when meeting a new individual online, however this feeling can be at least slightly repressed by gaining insight into why the participant chooses to use the site. This builds upon a plethora of research which suggests that an individual's motives for using and posting on SNS is affected by their personality (Fox & Rooney, 2015; Seidman, 2013; Wang, Jackson, Wang, & Gaskin, 2015) by highlighting the fact that individuals make judgements on an individual's personality based on what they believe that individual's motives for posting are. A potential suggestion to alleviate this concern would be to create a section of an individual's profile on the ACANTO site where the participant can explain why they signed up to the site and what they are looking to get out of being a member on the site.

However, trust is not only improved through understanding an individual's motives for using a site. Participants also discussed how they are distrusting of individuals who bring up finances when conversing online, bringing into question that individual's true motives for attempting to start a relationship.

> *P10: 'one thing which springs to mind is these people that come on and say ahh I'm in harsh financial trouble I could do with some money some help, can you send me a couple of quid or things like that and that's what my sons keep warning me about they're on the prowl all the time'.*

> *P5: 'if she were to ask me something or if her husband were to ask me something and it had anything to do with money or what I thought was strange then I'd probably step back two places'.*

When assessing the trustworthiness of another individual on a SNS, participants appear to use discussion of finance as a warning sign to question the true motives of that individual. In addition to this, it is clear that this worry about financial security when using a SNS shapes the participants willingness to use a site.

> *P1: 'I would not want to be asked what my income was for example or do I have any stocks or shares or that sort of thing. I wouldn't want that to go out on general release.'*

> *P8: 'Well again bank details or anything to do with finance, I certainly wouldn't go on a site where I had to pay because then they would have bank details.'*

This supports previous literature which suggests that a major barrier to an older adult's intention to use online shopping is financial risk (Lian & Yen, 2014). However, the current finding builds upon this research by highlighting financial concern as a barrier to using a SNS for older adults, whereby the primary function does not actually involve any financial transactions. The reason for this financial concern may be related to the participant's lack of confidence in their ability to navigate the online environment, however further research would be needed to clarify this. It is therefore suggested that the ACANTO SNS should make it clear to users that no financial details or requests are permitted through the site. This would allow for the removal of the financial risk trust barrier when attempting to get older adults to meet up through the site.

Control (Trust in site)

Another common theme evident within the data is the level of control participants have over a SNS impacts upon their level of trust in the site. In particular, the participants discussed how they do not want certain information made available to view on the site, placing high emphasis on the site's ability to keep their personal information private.

> P1: 'that would have to not be shared information. Well the background maybe could be but the phone, email and address (.) no that's something you'd choose to give out not something that is given out automatically'.

> P7: 'certainly if they didn't say we'll keep your details private, certainly if they didn't say that then I wouldn't trust 'em. If they said we will keep your details private but somehow if it was worded or it seemed like it was just a sort of standard phrase, erm I would have difficulty trusting them'.

This highlights how participants are aware of the vulnerabilities of putting their personal information into a SNS. Therefore, they feel more comfortable using sites which either allows them the ability to choose what information they share with the site or which take great care in ensuring the privacy of user's data. However, participants also acknowledge the complexity of the online environment and describe how they feel as though they have lost control over their information as soon as they decide to put it onto a SNS.

> P4: 'in what I see as a very public forum so I start from the assumption that anything up there is public and anything that's up there might eventually go somewhere else'.

> P6: 'I dunno how many friends I've got on Facebook maybe about 250 but if their security levels are a bit more lax than mine then someone can get in through theirs even though I'm being pretty secure about it, know what I mean'.

This fits in line with previous research which suggests that older adults have privacy concerns when using online SNS (Gibson et al., 2010; Nef et al., 2013). However, the current study builds upon this by highlighting the link that these privacy concerns