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Deliverable D2.2
Specification of Elder-Spaces Services & Applications

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***Deliverable Type:** *PU= Public, RE= Restricted to a group specified by the Consortium, PP= Restricted to other program participants (including the Commission services), CO= Confidential, only for members of the Consortium (including the Commission services)*

** ***Nature of the Deliverable**: *P= Prototype, R= Report, S= Specification, T= Tool, O= Other*

Abstract: Detailed specification of the aimed systems' functionalities and user interfaces for tabletop and web implementation with focus on accessibility and usability. Analysis of the social impact expected for selected functionalities.

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Glossary

AAL	Ambient Assisted Living
API	Application Programming Interface
iWiW	Internet Who is Who
PC	Personal Computer
UI	User Interface
URL	Uniform Resource Locator
WP	Work package

Executive Summary

Deliverable D2.2 "Specification of Elder-Spaces Services & Applications" comprises the results of the following tasks within work package WP2 "Social Networking Services and Applications Specification":

- **T2.2 "Games and Events Management",**
- **T2.3 "InterGeneration Services", and**
- **T2.4 "Structured Training and Lifelong Learning"**.

D2.2 is based on the results of WP1 "Requirements and Use Cases" and on the work of Task T2.1 "Specification of User Interfaces, Cognitive Social Search and Personalization" documented in D2.1 "User Interfaces & Cognitive Social Search".

Its main purpose is

- to specify the **basic functionality** of the Elder-Spaces social network platform;
- to specify the **user-interfaces and user-interaction**, respectively, for the selected **applications** of Elder-Spaces: games, events, inter-generation services, training & learning;
- to describe the potential **social impact** of the applications.

Chapter 2 gives a specification of "Basic Functions" of the iWiW platform as far as it is relevant for Elder-Spaces. Function categories are authentication, profile management, friend management, group management, event management, media & album management, messaging, and simple search. – Each function is described in a textual way as well with the help of a corresponding activity diagram.

Chapters 3 and 5 deal with "Games for the Elderly" and "Intergenerational Activities". After a categorization and discussion of the applications, the specification of the user-interfaces under special consideration of games for tabletops and a reusable framework, as well as technical aspects (login, personalization, profiling, messaging) are described, including a workflow diagram. Potential social impacts are described and discussed in detail; this is done here already with respect to the user trials of Elder-Spaces.

Chapter 4 "Travel Memories" combines aspects of games and intergenerational activities in this special application. It contains a specification of the Web interface and the UI for tabletops with detailed descriptions of the main screens and technical aspects.

Chapter 6 contains the specification of the user-interfaces, UI storyboards, detailed descriptions of the main screens, technical aspects, a workflow diagram, and extended discussion of social impact of the application "Structured Training and Lifelong Learning".

All described applications somehow include, or are linked to "Events management". Therefore, this application occurs or is mentioned in several chapters.

1. Introduction

1.1 Overview

Deliverable D2.2 "Specification of Elder-Spaces Services & Applications" comprises the results of the following tasks within work package WP2 "Social Networking Services and Applications Specification":

- **T2.2 "Games and Events Management",**
- **T2.3 "InterGeneration Services", and**
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Its main purpose is

- to specify the **basic functionality** of the Elder-Spaces social network platform;
- to specify the **user-interfaces and user-interaction**, respectively, for the selected **applications** of Elder-Spaces: games, events, inter-generation services, travel memories, training & learning;
- to describe the potential **social impact** of the applications.

Chapter 2 gives a specification of "Basic Functions" of the iWiW platform as far as it is relevant for Elder-Spaces. Function categories are: authentication, profile management, friend management, group management, event management, media & album management, messaging, and simple search. – Each function is described in a textual way as well with the help of a corresponding activity diagram.

Chapters 3, 5, and 6 deal with the applications "Games for the Elderly", "Intergenerational Activities", and "Structured Training and Lifelong Learning". After a categorization and discussion of the applications, the specification of the user-interfaces under special consideration of tabletops and a reusable framework, as well as technical aspects (login, personalization, profiling, messaging) are described, including UI storyboards and workflow diagrams. Potential social impacts are described and discussed in detail.

Chapter 4 "Travel Memories" combines aspects of games and intergenerational activities in this special application. It contains a specification of the Web interface and the UI for tabletops with detailed descriptions of the main screens and technical aspects.

All described applications somehow include or are linked to "Events management". Therefore this application occurs in several chapters.

1.2 Relation with other tasks and work packages

D2.2 is based on the results of WP1 "Requirements and Use Cases" and on the work of Task T2.1 "Specification of User Interfaces, Cognitive Social Search and Personalization" documented in D2.1 "User Interfaces & Cognitive Social Search".

D2.2 complements the general concept of Elder-Spaces user-interfaces, including usability criteria, special UI elements and devices, and accessibility features, as described in D2.1, and the detailed specification of the overall system architecture, as described in D2.3 "Elder-Spaces Platform Architecture".

The document will be essential for the development tasks of WP3 "Reusable Applications Elements and Web 2.0 Mashups" and WP4 "Elderly friendly User Interfaces and Cognitive Search".

It will also help to structure the work in tasks T6.1 "Trial Protocols and Evaluation Metrics" and T6.3 "Platform, Services and Applications Evaluation" of WP6 "Trials and Evaluation".

2. Basic Functions

In this section, activity diagrams describe the basic functions of the Elder-Spaces-platform. To diminish the complexity, the handling of system errors and cancellation of actions by the users are explicitly excluded.

2.1 Authentication

2.1.1 Registration

The authentication mechanism consists of three different activities. Before a login is possible, it is required that the user registers in the system. This process is described in Figure 1. A link to the registration page is placed on the login page. On the registration screen, the necessary information has to be entered by the user. If this passed successfully the different validity checks, the system sends a confirmation email with a link, which the user has to follow to finish the registration. The user is instructed about that step by a particular screen. After 24 hours without confirmation, the user profile is dropped for security reasons.

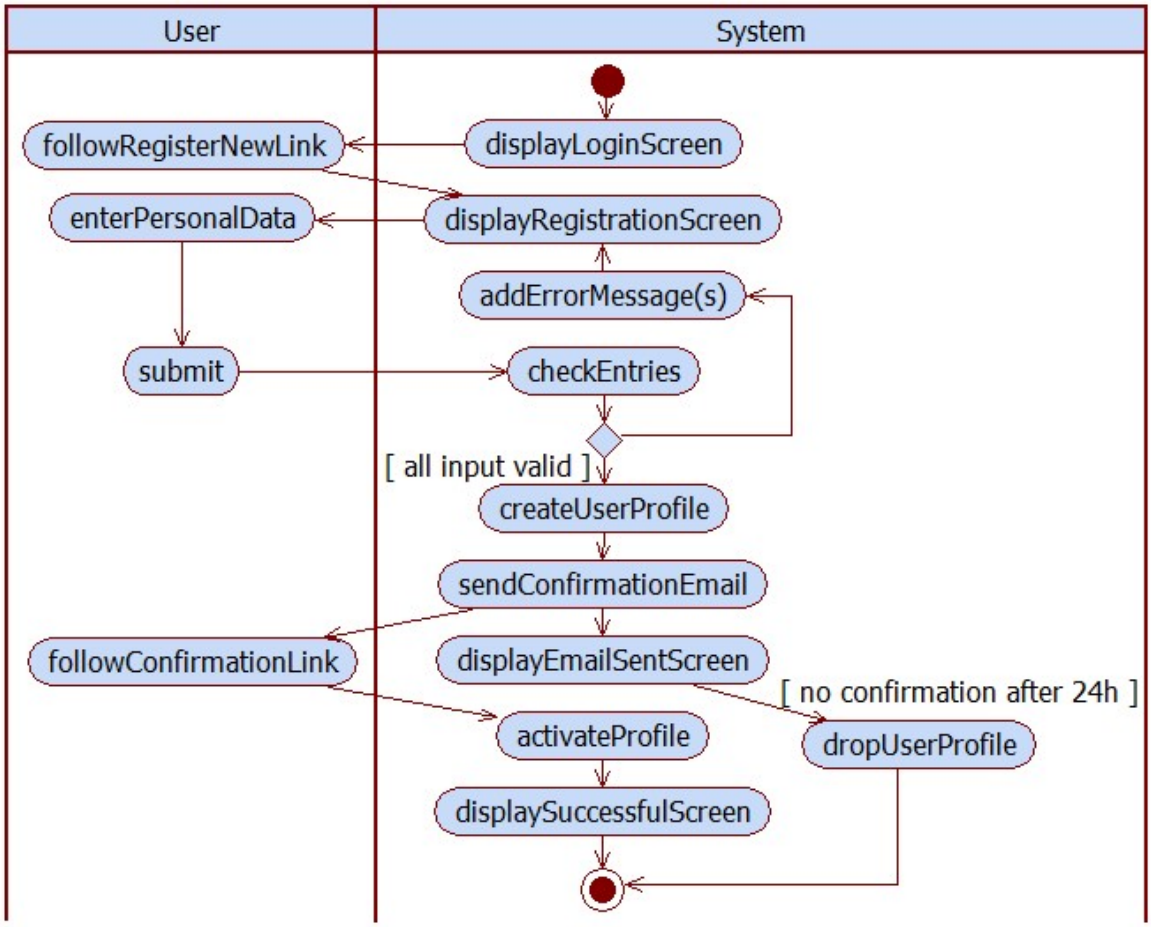

Figure 1: Activity Diagram – Registration

2.1.2 Login

For registered users it is possible to authenticate to the system with the simple login. This should be the mostly used activity related to authentication and is described in Figure 2.

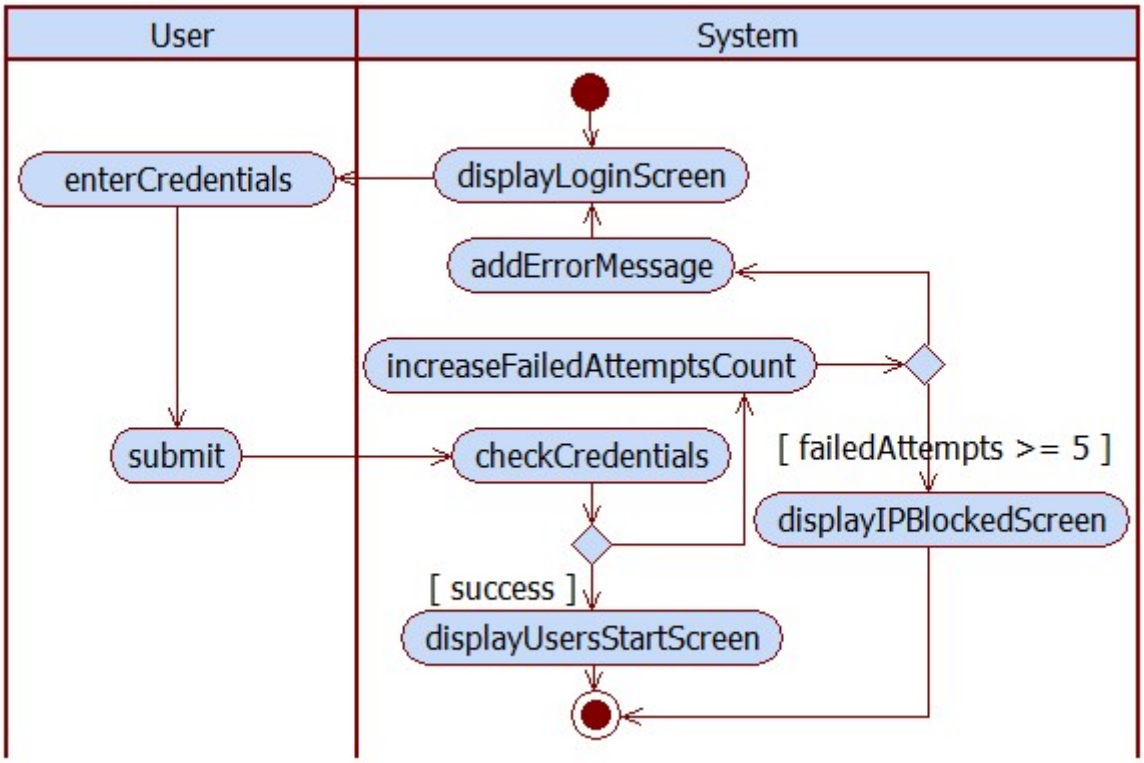

Figure 2: Activity Diagram – Login

2.1.3 Password retrieval

Sometimes the user is not able to login, because they forgot their credentials. Therefore, a password retrieval mechanism is provided as described in Figure 3.

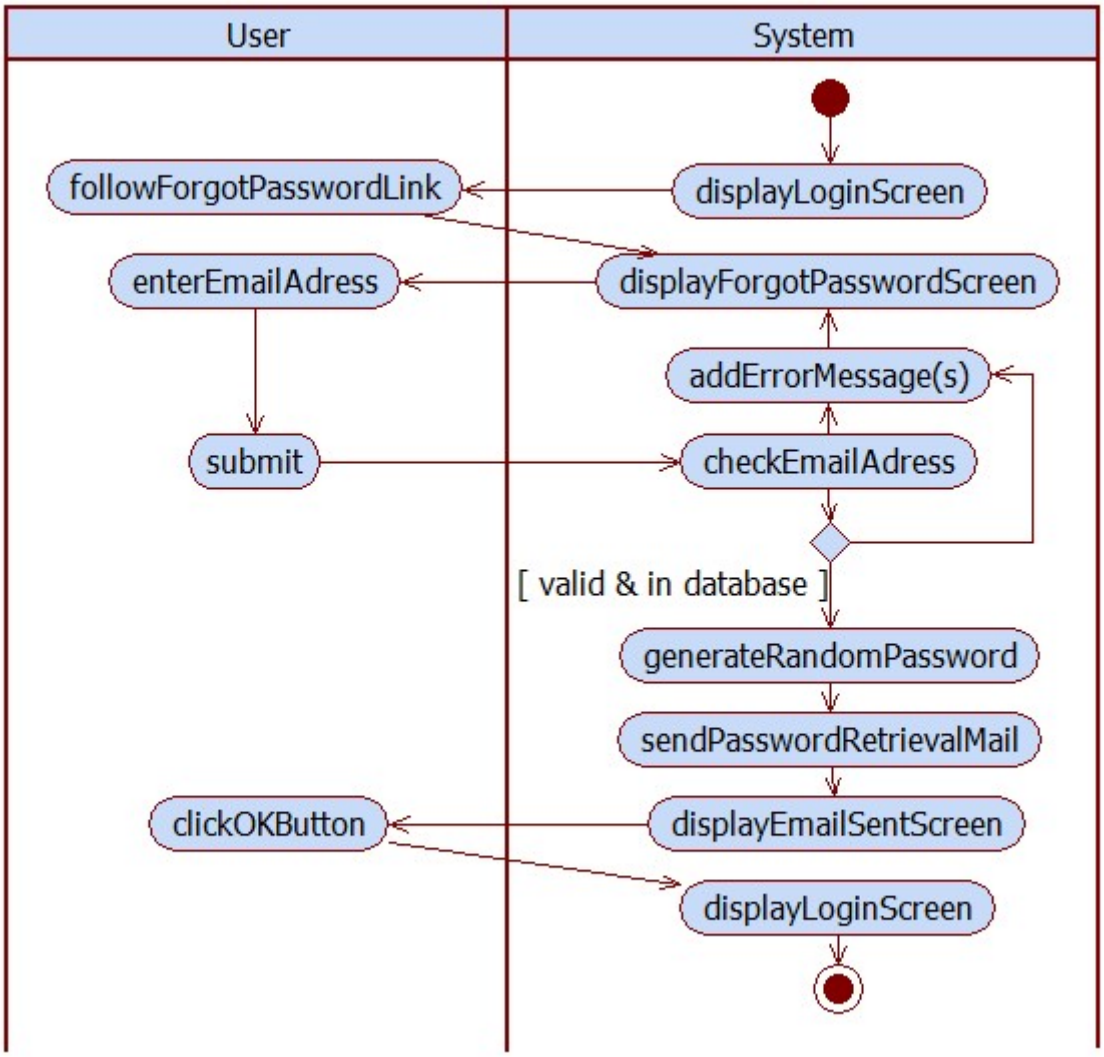

Figure 3: Activity Diagram – Password reset

2.2 Profile management

The core element of the user's account is the profile. Because the users are the owners of their data, they must have the opportunity to edit their profile data. This may contain many personal data like the profile picture, the name, contact data, date of birth, gender, marital status, languages spoken, etc. Nevertheless, even recent schools, workplaces and residences can be set. In addition, relationships, membership in groups, the participation in events and uploaded media are saved in the profile. Furthermore, the notification, privacy and application settings are placed here. To reduce the complexity of Figure 4 these different types of data are generalized to the profile data. In addition, the deactivation of the profile is abstracted to setting the status to 'inactive'. The process is similar to the registration described in chapter 2.1 only differing in the amount of data and the option to preview the changes made in the profile.

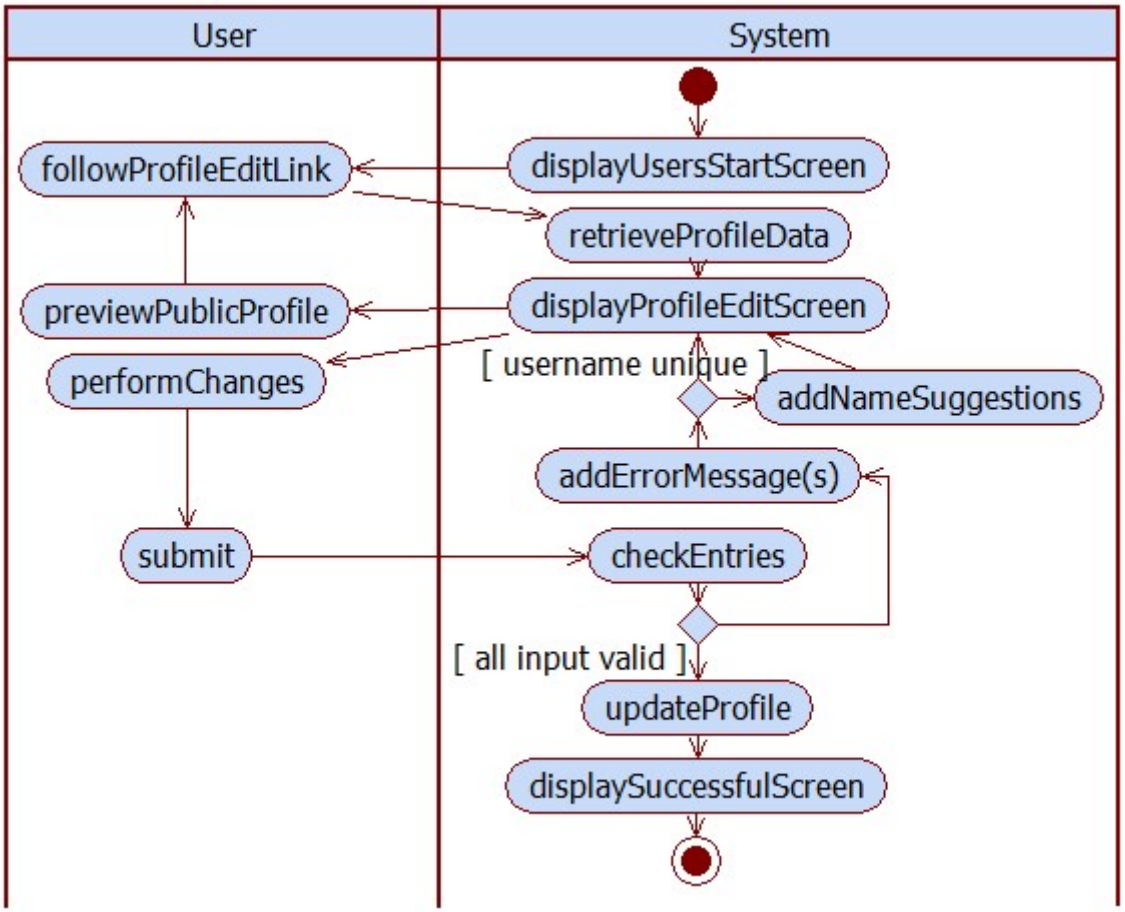

Figure 4: Activity Diagram – Edit Profile

2.3 Friend management

The Friend Management is adding and removing relationships to other users' profiles. This influences the visibility of content and activity rights to the users included in the own friends list. One may explicitly set the privacy of produced content to be seen or used only by own friends.

2.3.1 Send friend invitation

Figure 5 shows the process of inviting a user to establish a friendship connection. It is similar to the general sending of invitations as described in chapter 2.7.3.1., but if the user selects to send a friend invitation, a screen opens where the user can select the recipients of the invitation and add them to a group of friends instantly. If the group to add the users to does not exist, the user is able to create a new group by clicking the corresponding button. Back on the invitation screen, the user can select that group to which the new friend will be assigned. Responding to invitations in general is described in chapter 2.7.3.2. If the response is positive, the users are added to each other's friend list. If selected, the responding user is added to the assigned group of friends.

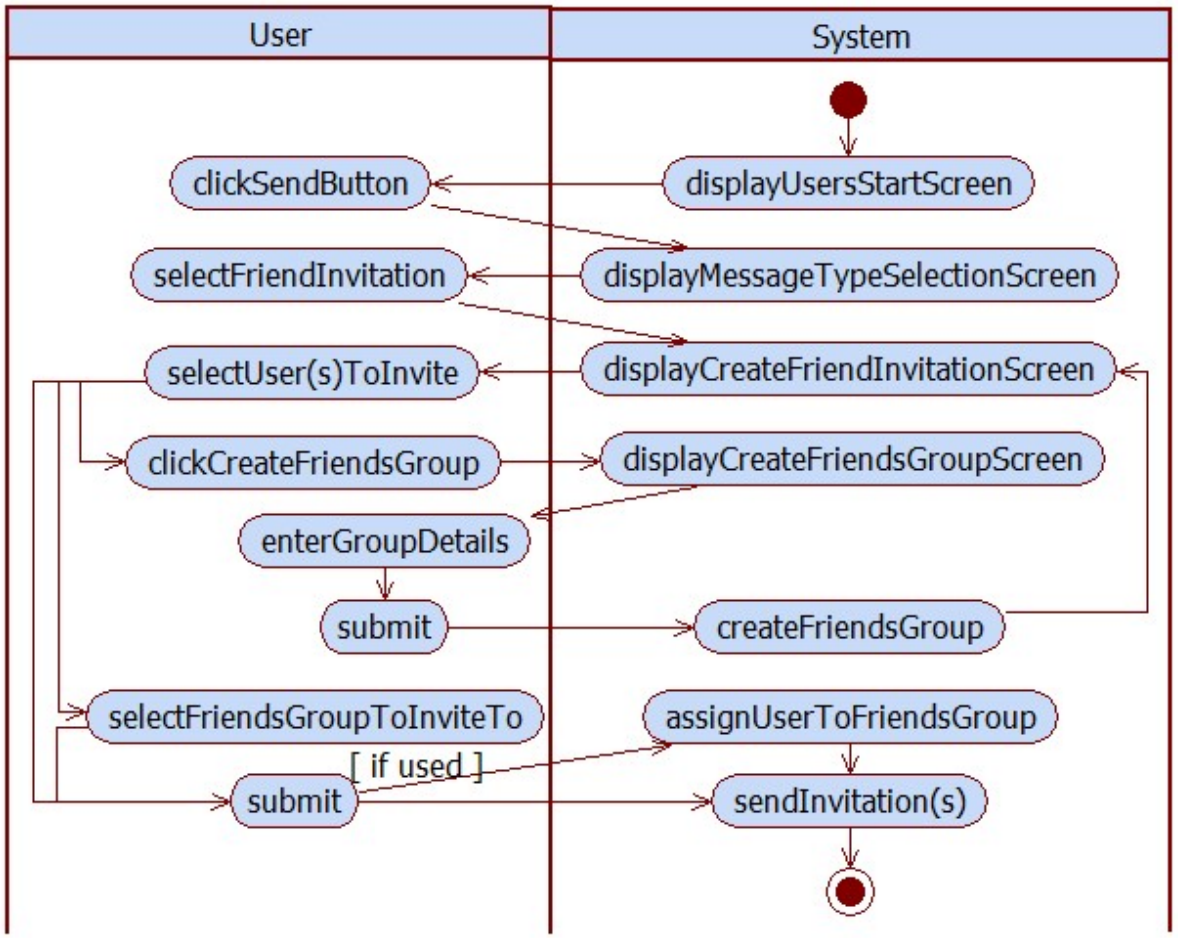

Figure 5: Activity Diagram – Send friend invitation

2.3.2 Remove friend

The process of removing a friend is similar to adding, but the starting point is the user's friend list. A user can make the decision to remove a friend without the other's consent. If the relationship is removed, the system removes the users from each other's friend list.

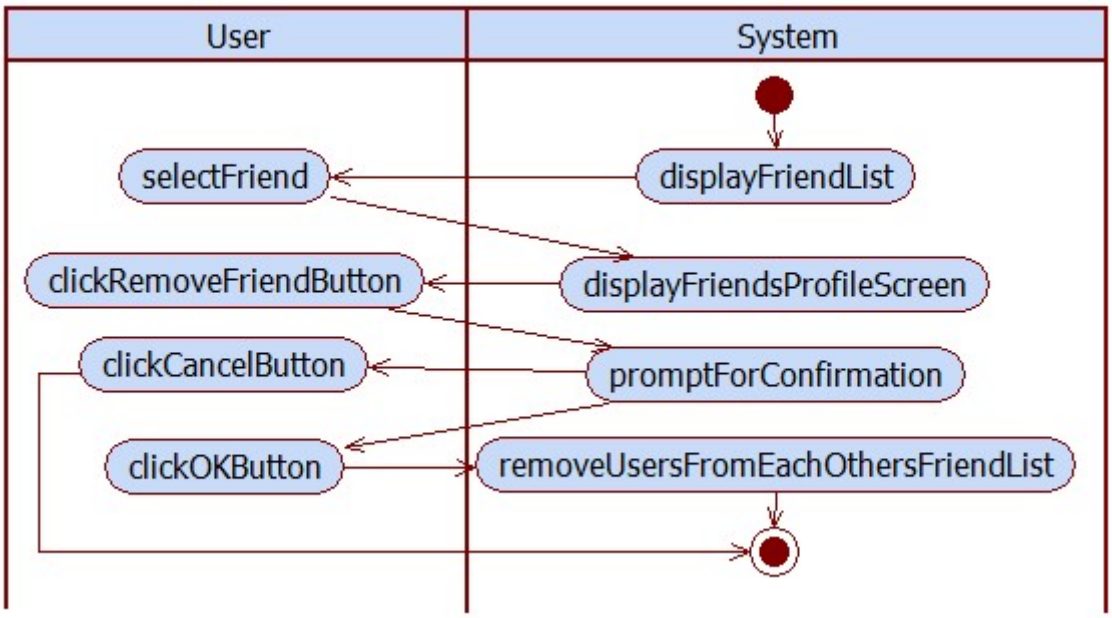

Figure 6: Activity Diagram – Remove Friend

2.4 Group management

2.4.1 Create a group

To create a group the user just has to click on the corresponding button on the UI. A screen is shown where the user can set the group's name, a description, a category and if the group should be open to public or closed. Finally, the user has to declare the agreement to the terms and conditions by checking a checkbox and can save the group. After creating the group, the user is prompted for the next action. If they choose to edit the group, the system displays the group edit screen where the user may edit further details.

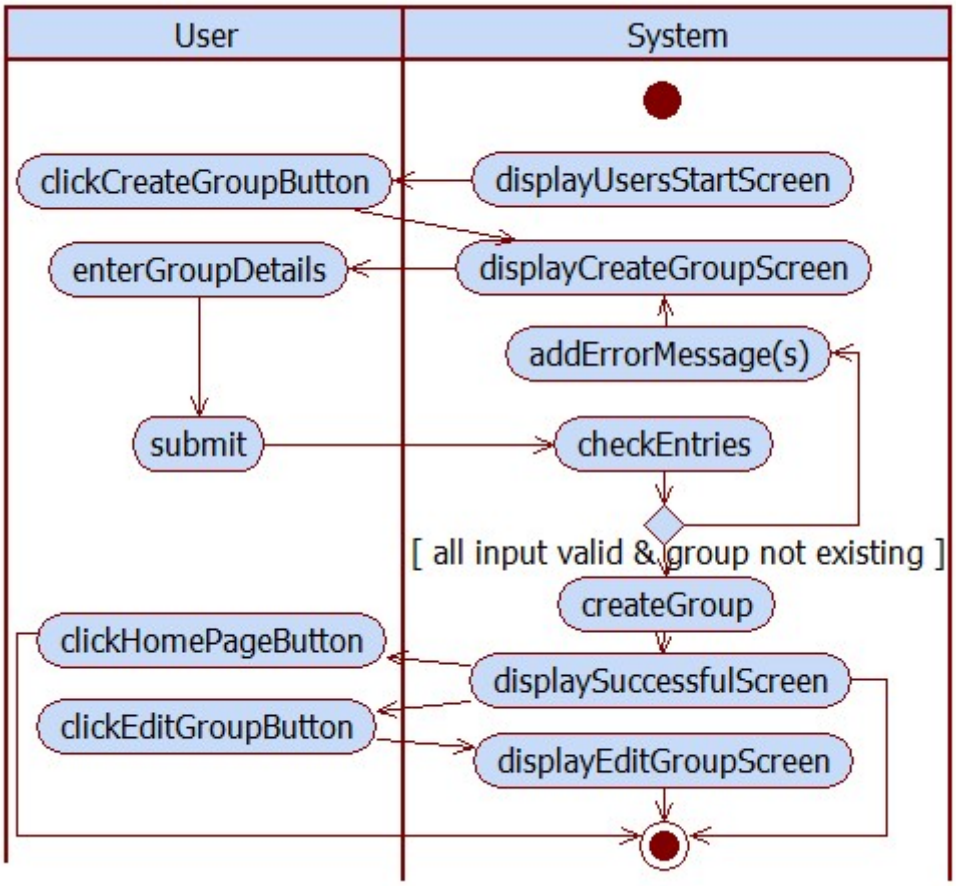

Figure 7: Activity Diagram – Create Group

2.4.2 Edit a group

To edit a group the user may use the search functionality to retrieve the group or select it from the list of their groups from their profile. If the user is the owner respectively, the creator or a later assigned secondary moderator of the group, a button to edit it is shown. When the button is clicked the edit screen is shown where the details set on creation and additional settings may be edited. The group can be added to more categories, the local area may be set and privacy as well as application settings can be done. As mentioned above, even additional group moderators can be assigned here by selecting them from the list of group members and the owner may be changed.

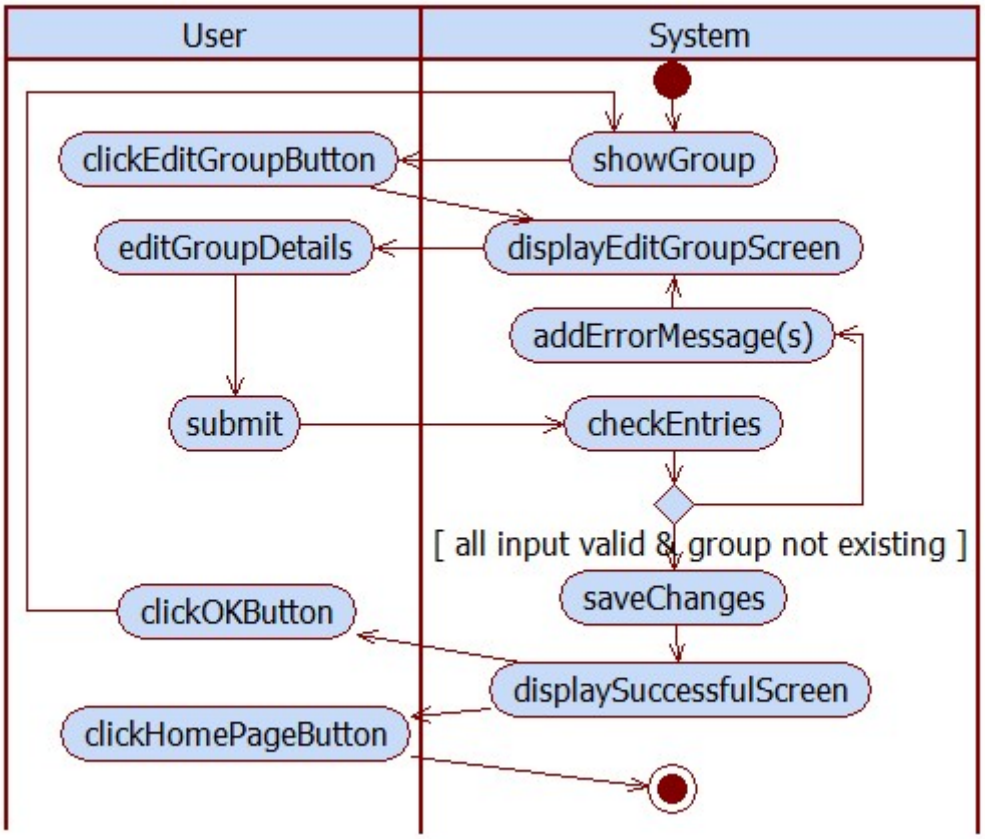

Figure 8: Activity Diagram – Edit Group

2.4.3 Delete a group

If the owner wants to delete a group, they must navigate to the group as already described in chapter 2.4.2. If the button for deleting a group is used, a screen opens that prompts for confirmation. If the user clicks on the "OK"-button, the group will be deleted.

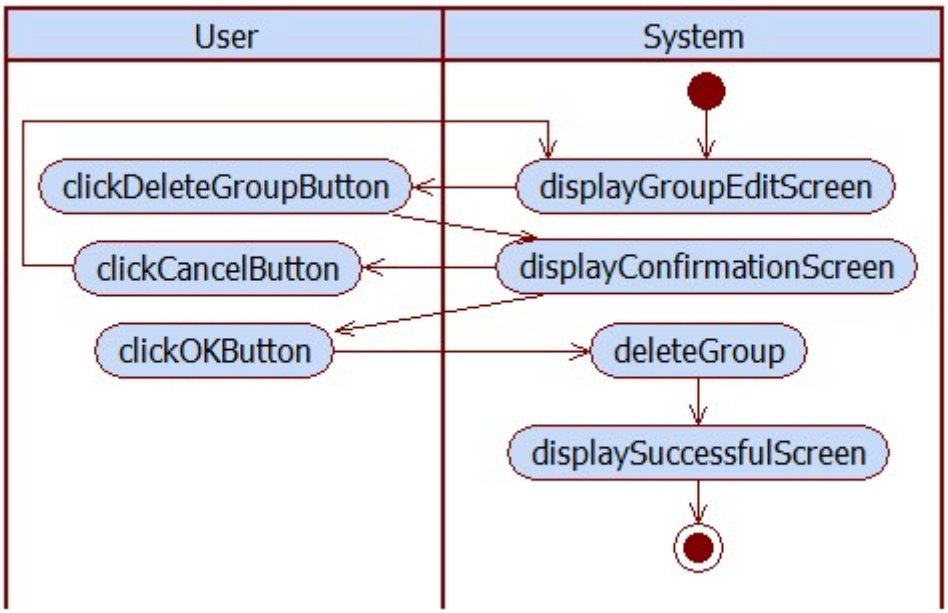

Figure 9: Activity Diagram – Delete Group

2.4.4 Membership control

There are two main scenarios influencing the membership control in groups. When editing a group the moderator can set the privacy. If set to 'public', any authenticated user may join the group. If set to 'closed', the moderator has to invite members, which may also invite persons on their friends list, if allowed by the moderator. Each member has the right to leave the group; its owner can ban unwanted members.

2.4.4.1 Open groups

In groups that are open for everyone, the users can simply use the corresponding button to join a group and leave the group in the same way. Invitations, as described in chapter 2.7.3, can be sent from every user to another one. The owner of the group may ban a user from the user list, if needed.

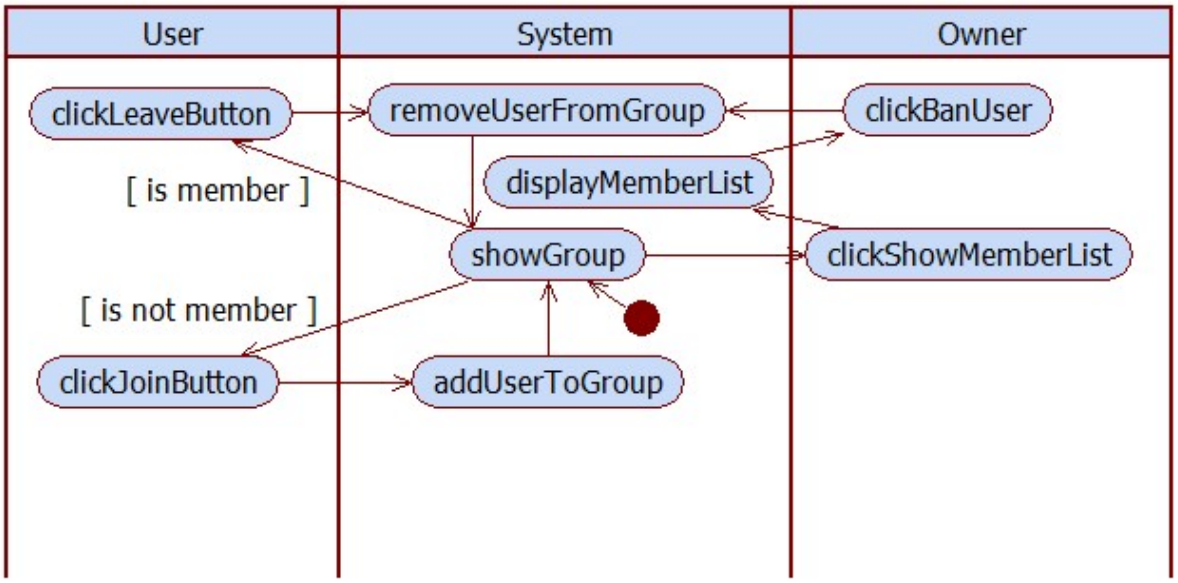

Figure 10: Activity Diagram – Membership control in open groups

2.4.4.2 Closed groups

In the group settings, the group owner can simultaneously activate four different methods to restrict group membership.

Collecting required count of recommendations

The user who wants to get membership to the group uses a button to request membership. The group members have a list of pending requesters, which they can either support or reject. The number of required supporters can be set in the group settings.

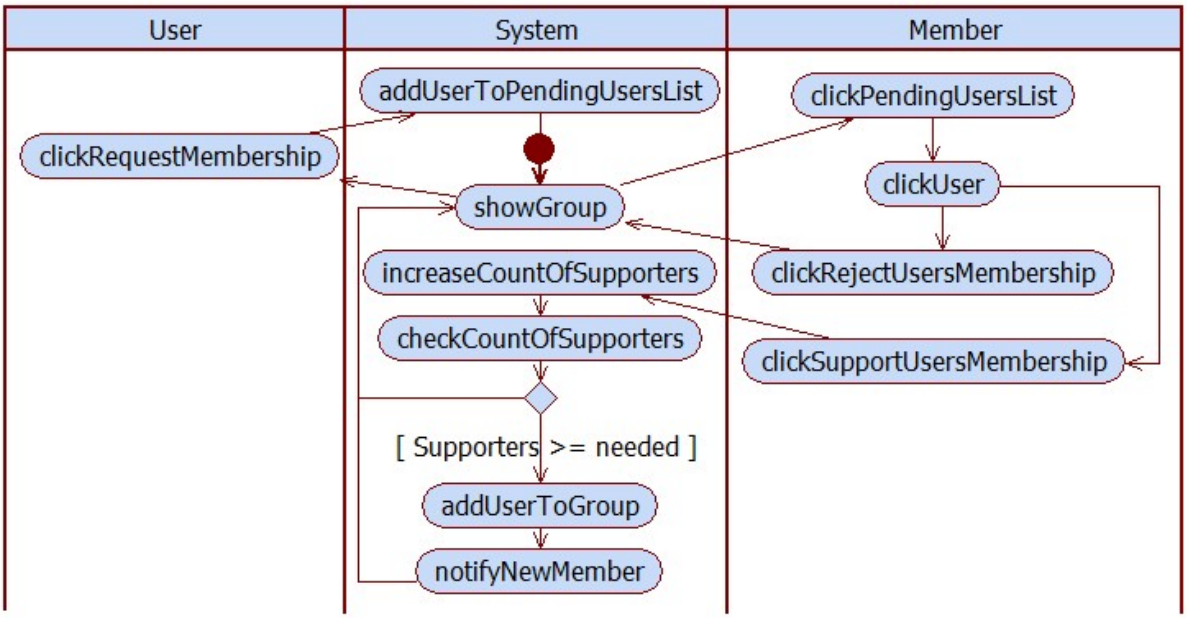

Figure 11: Activity Diagram – Membership by recommendations

Membership by invitation

New members can be invited by the group moderator and are group members directly on accepting the invitation. This process is described in chapter 2.7.3.

Invitation by members

This is the same as membership by invitation, but all group members can do the invitations. It is also the same description in chapter 2.7.3.

2.5 Event management

2.5.1 Create an event

To create an event the user just has to click on the corresponding button on the UI. A screen is shown where the user can set the event's name, select the category out of a list, select if it is private or public, set the start date and time, optionally the date and time of completion, the name and address of the location, a small text for announcement and a description. In addition, a picture corresponding to the event can be uploaded. The event date may be in the past. If the user submits the form, the event is created and shown. Events can also be created within groups where their visibility is set to group members only.

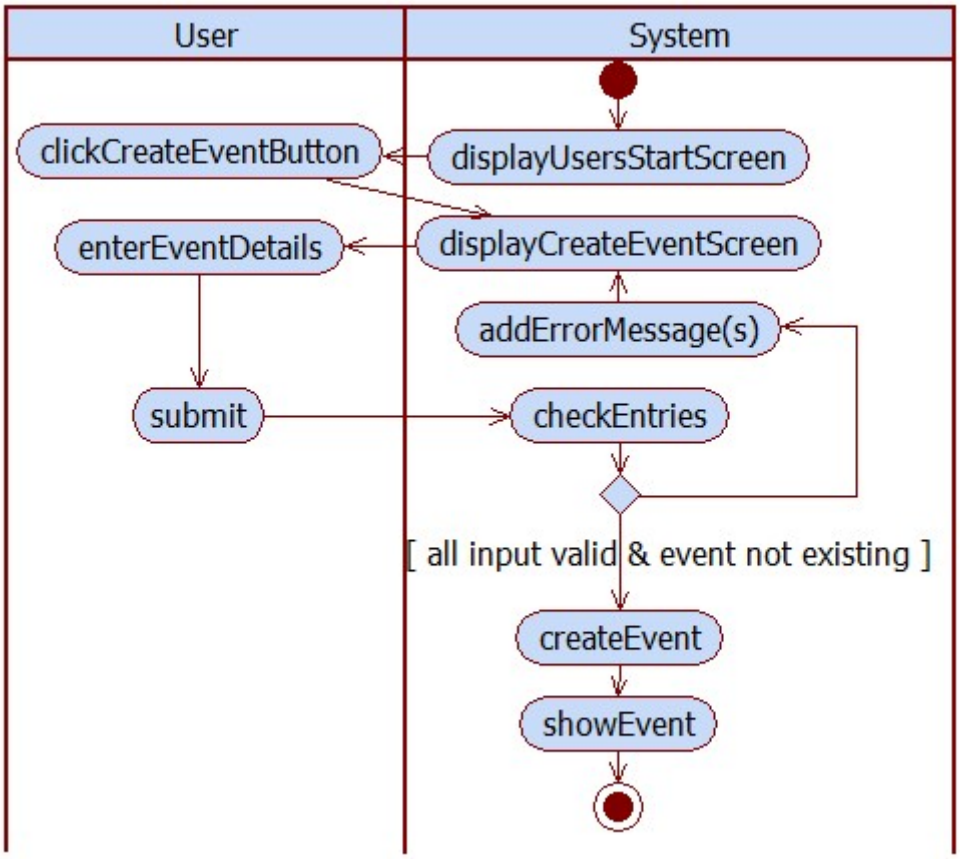

Figure 12: Activity Diagram – Create Event

2.5.2 Edit an event

To edit an event the user may use the search functionality to retrieve the event or select it from the list of their events from their profile. If the user is the owner respectively, the creator or a later assigned secondary editor of the event, a button to edit it is shown. When the button is used, the edit screen is shown where the details may be edited. The privacy settings cannot be edited after creation.

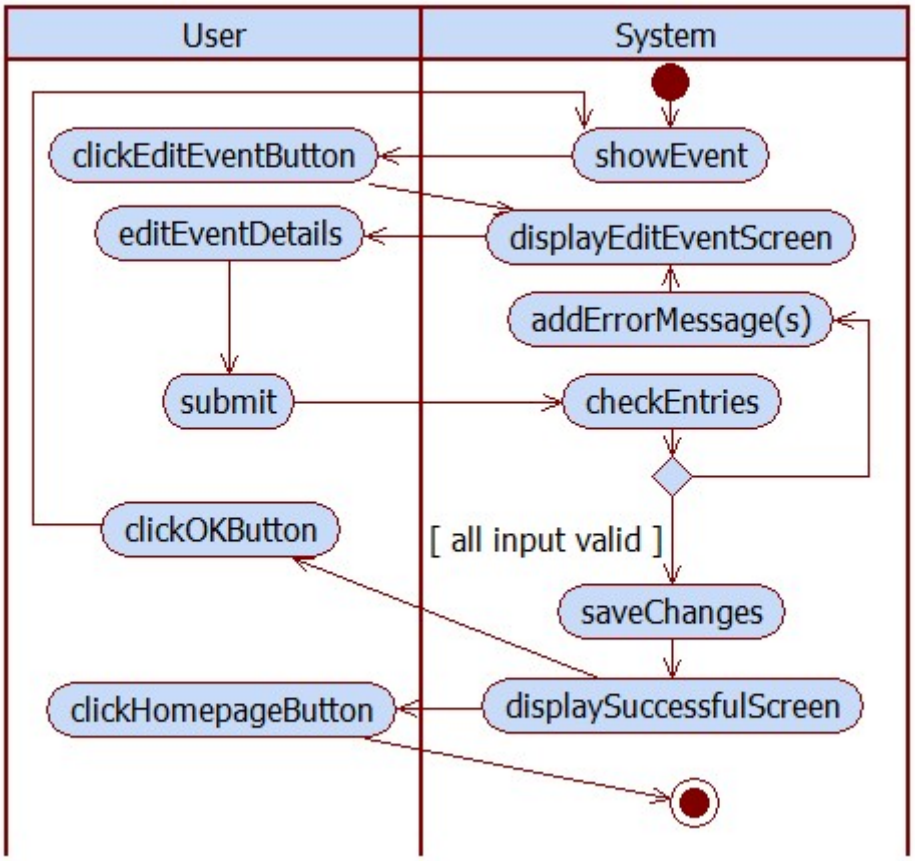

Figure 13: Activity Diagram – Edit Event

2.5.3 Delete an event

If the owner wants to delete an event, they must navigate to the event as already described in chapter 2.5.2. If the button for deleting an event is used, a screen opens that prompts for confirmation to avoid unintended deletion. If confirmed the event will be deleted.

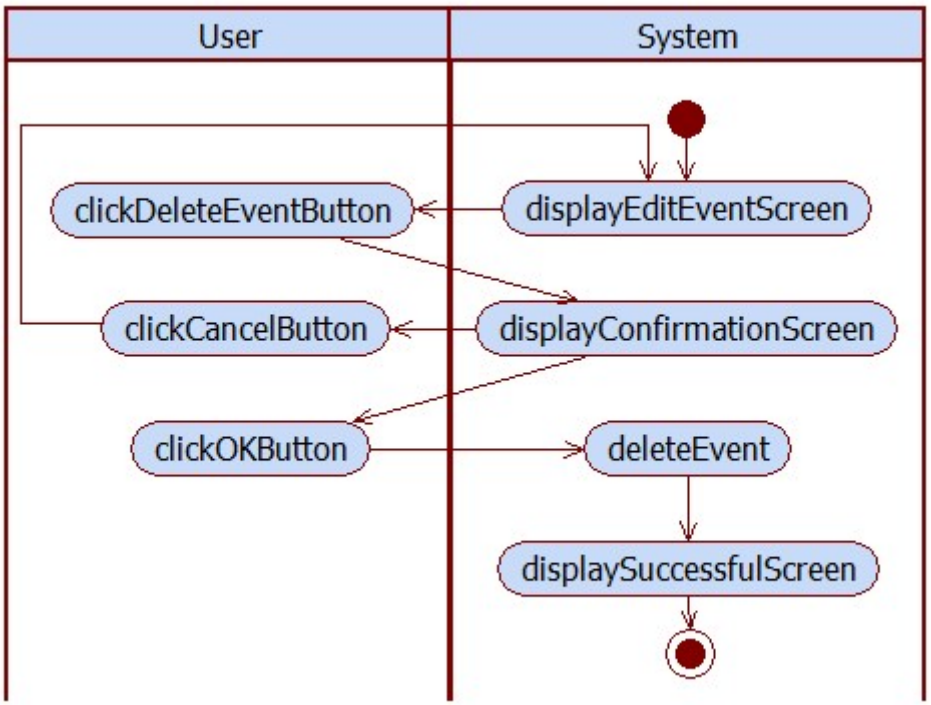

Figure 14: Activity Diagram – Delete Event

2.6 Media and album management

Media can be uploaded to the platform as either profile photo or concerning to events and groups or even organized in albums. Therefore, the upload picture buttons are attached on the profile edit screen as well as on the start screen of groups and events. In addition, comments can be enhanced by adding pictures.

2.6.1 Upload media

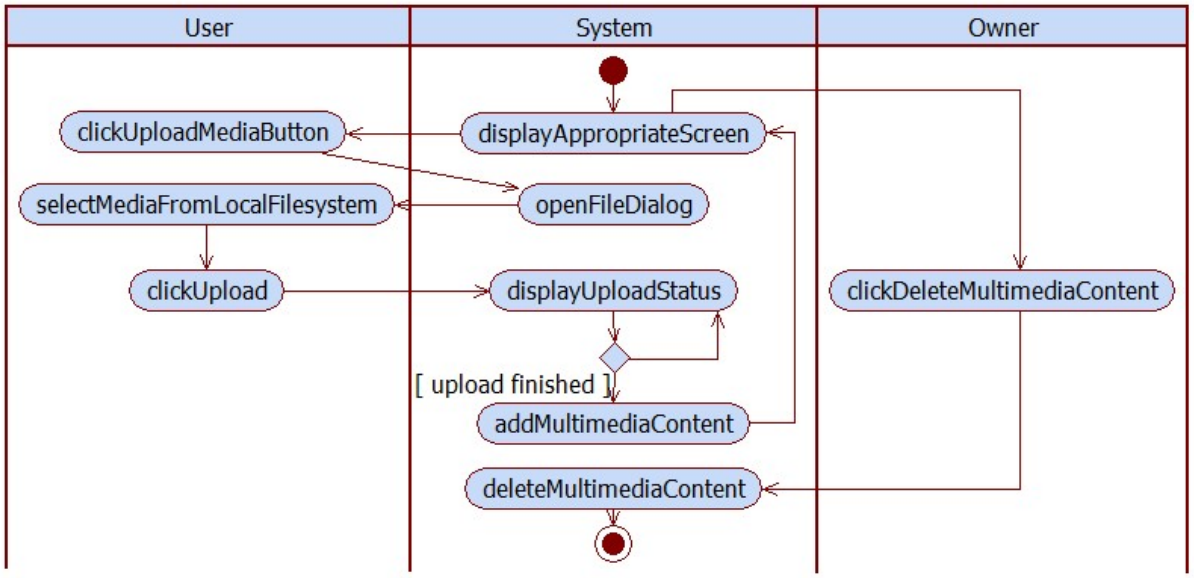

Figure 15: Activity Diagram – Upload Media

2.6.2 Create an album

To create an album the user must navigate to the pictures section in their profile. There an album can be created by clicking the corresponding button. The user is prompted for the album's name and if it shall be public, restricted to friends, or even restricted to a particular group of friends. On submitting the upload page, the upload screen is shown where the user can upload photos as described in chapter 2.6.1.

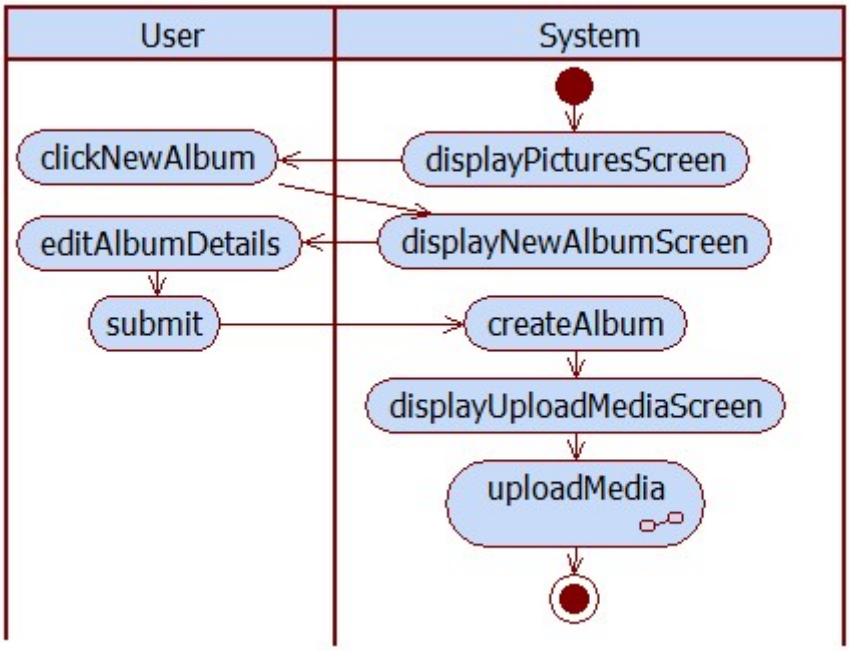

Figure 16: Activity Diagram – Create Album

2.6.3 Browse albums

If users have sufficient rights to view one or more albums of other users or want to browse their own albums, they have to navigate to the pictures page. There the albums are displayed by their thumbnails. By clicking on one of them, the album is opened and thumbnails of the pictures in the album are shown. If one of the thumbnails is clicked, the full picture is shown. By clicking on the left and right borders of the picture the previous respectively the next picture is shown. The albums and the navigation bar are always shown to leave the single picture view.

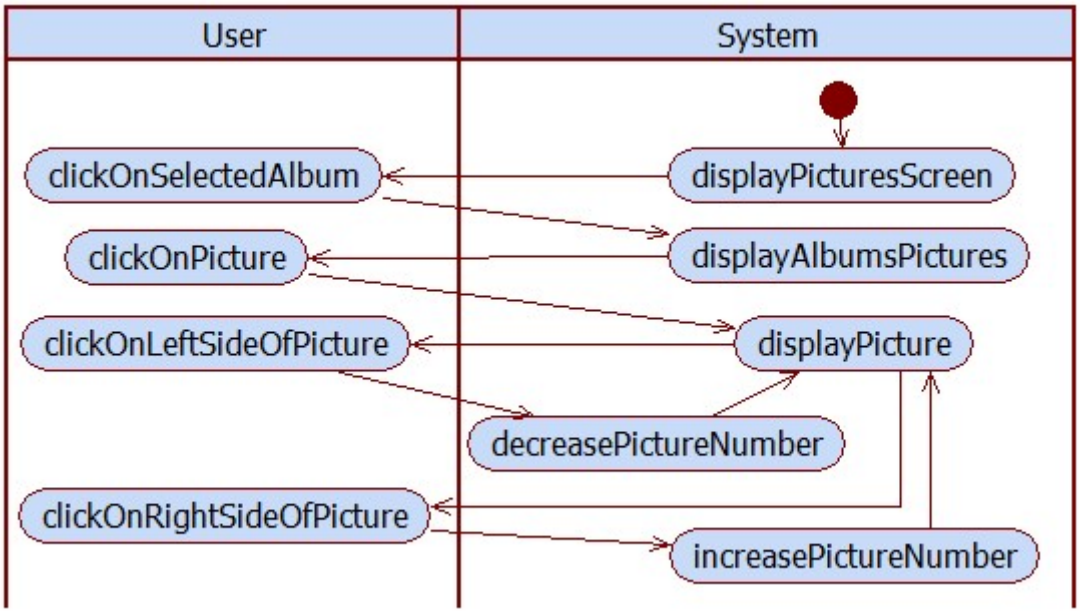

Figure 17: Activity Diagram – Browse Albums

2.7 Messaging

Messaging is one of the most important functionalities of the system, because the exchange of messages is the most important social interaction.

2.7.1 Wall

Some objects inside the platform, e.g. persons, groups, games and events, may have so called "walls". These act as a channel for asynchronous many-to-many communication[1]. Users can leave messages for a group of other users that have the sufficient rights by typing it into the text field shown on top of the wall. Multimedia content can be added. After submitting, the message is added to the list of messages, which is sorted descending by date, and can be read and commented by friends, other members of the particular group or participants of the particular event. The process of commenting is described in chapter 2.7.4. The entries cannot be edited after publishing but deleted by the creator or moderators.

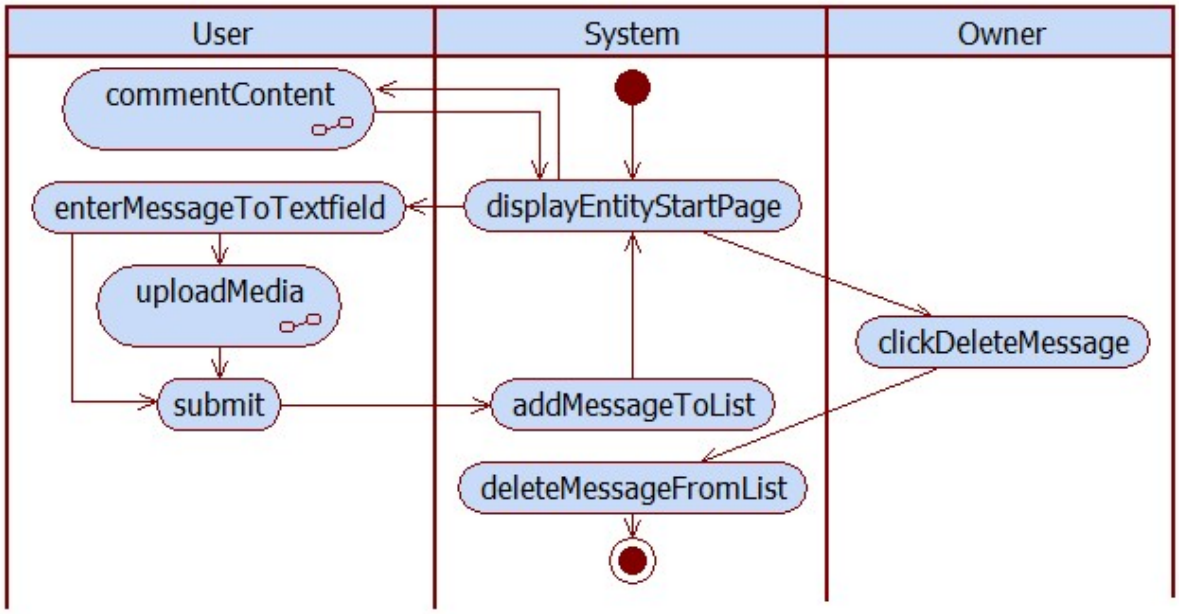

Figure 18: Activity Diagram – Wall messaging system

2.7.2 Message management

Even a messaging system similar to email is provided. This can be used for asynchronous one-to-one communication as well as for one-to-many communication[1]. Messages can be sent from a lot of places, e.g. by moderators of groups or creators of events on the respective start screen to all members or participants and by everyone on a user's profile to the profile owner. In addition, a special messaging page is provided with an "incoming" and "sent"-folder well known from other email-clients.

2.7.2.1 Send message

The user can compose messages by entering recipients, a subject and a message and send them. Files or multimedia content cannot be appended. If the system sent the message, it provides a notification about the success of the action. The recipients are notified by a signal on their start screen and by email, if set to in their profiles' notification settings.

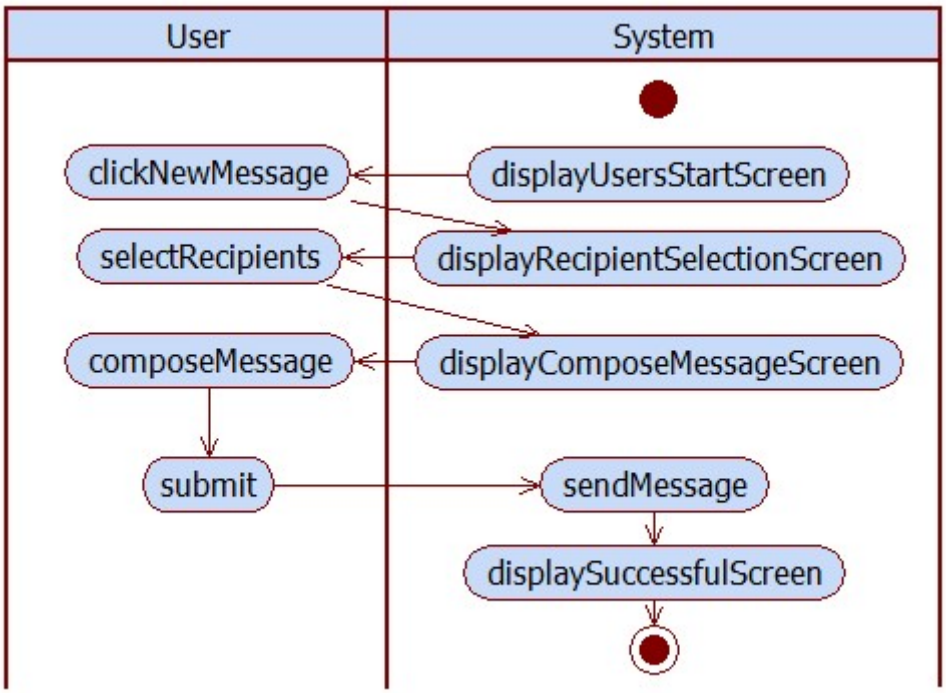

Figure 19: Activity Diagram – Send Message

2.7.2.2 Read message

Users are notified about incoming messages by a signal on their own start screens or by email depending on the settings about notifications in their profile as mentioned above. By clicking on it, the message list is opened and by clicking on a particular message, the user can read it.

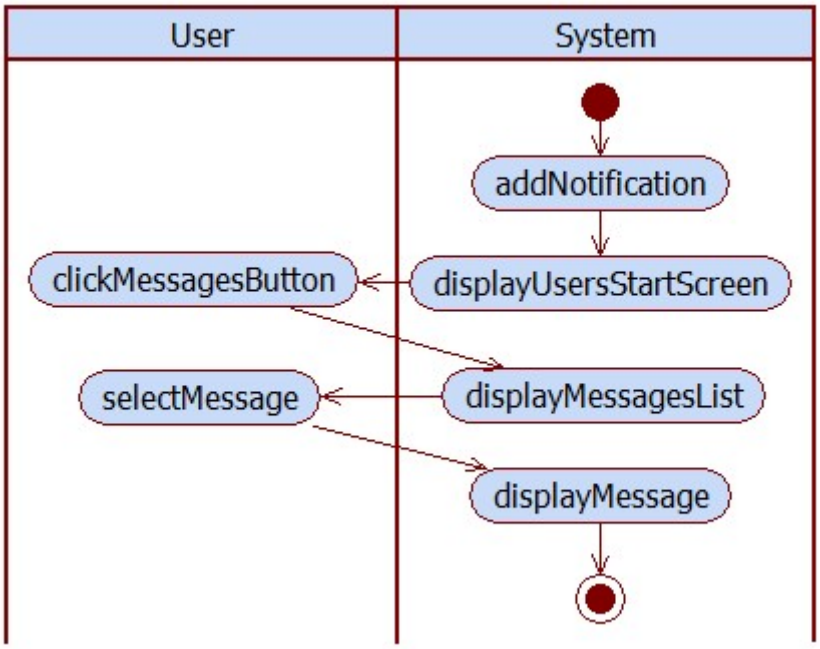

Figure 20: Activity Diagram – Read Message

2.7.2.3 Reply to message

To reply to a message, the user has to follow the steps described above. In the message's detail view, they can press the button labelled "Reply", which opens a screen where they can compose their reply. By submitting, the system sends the reply and notifies about its success.

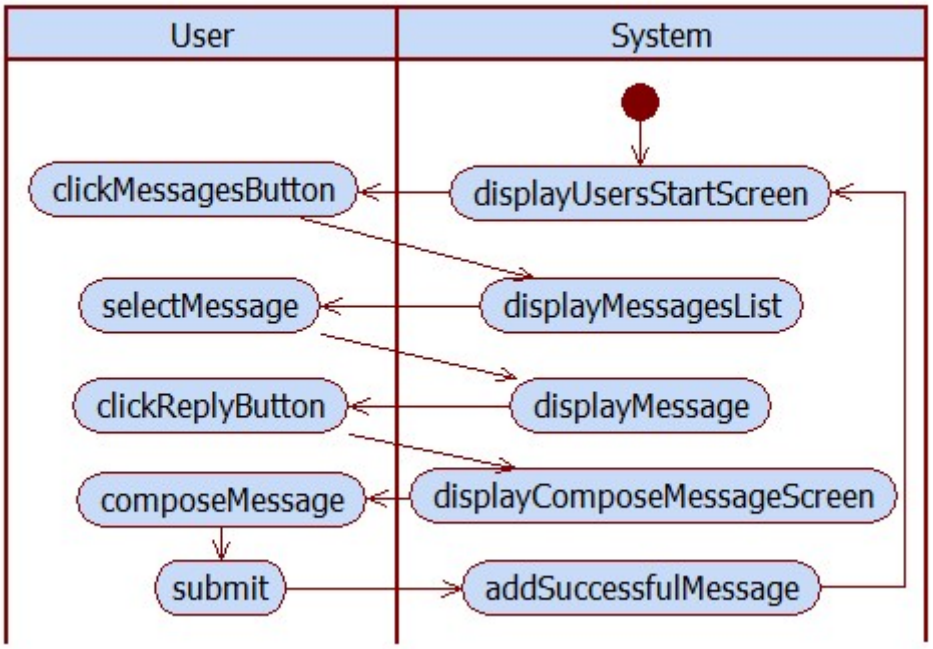

Figure 21: Activity Diagram – Reply to Message

2.7.2.4 Delete message

Also on the messages detail screen, a button is located to delete messages. On click, the system deletes the message.

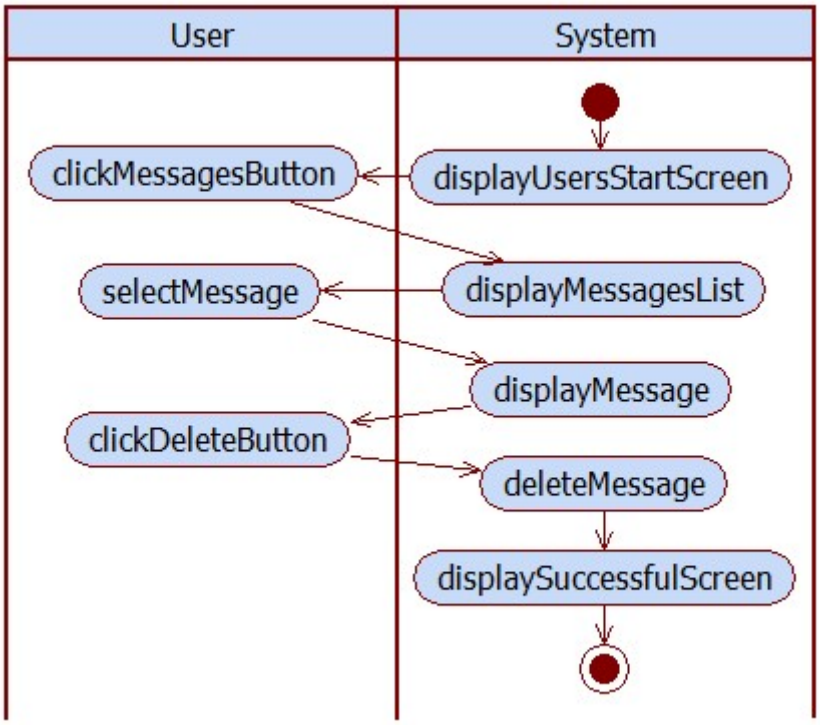

Figure 22: Activity Diagram – Delete Message

2.7.3 Send and respond to invitations

Invitations are a special form of messages sent out of the start pages of the particular objects, e.g. games, groups, events or intergenerational activities.

2.7.3.1 Send invitations

The user has a "Send"-Button on the start screen, which leads them to a page where they are prompted to select the type of invitation – friend, group, event or intergenerational activity. On submit the user can select the particular object and the recipient(s). If both are selected and submitted, the system sends the invitation(s) and displays a notification about the action's success.

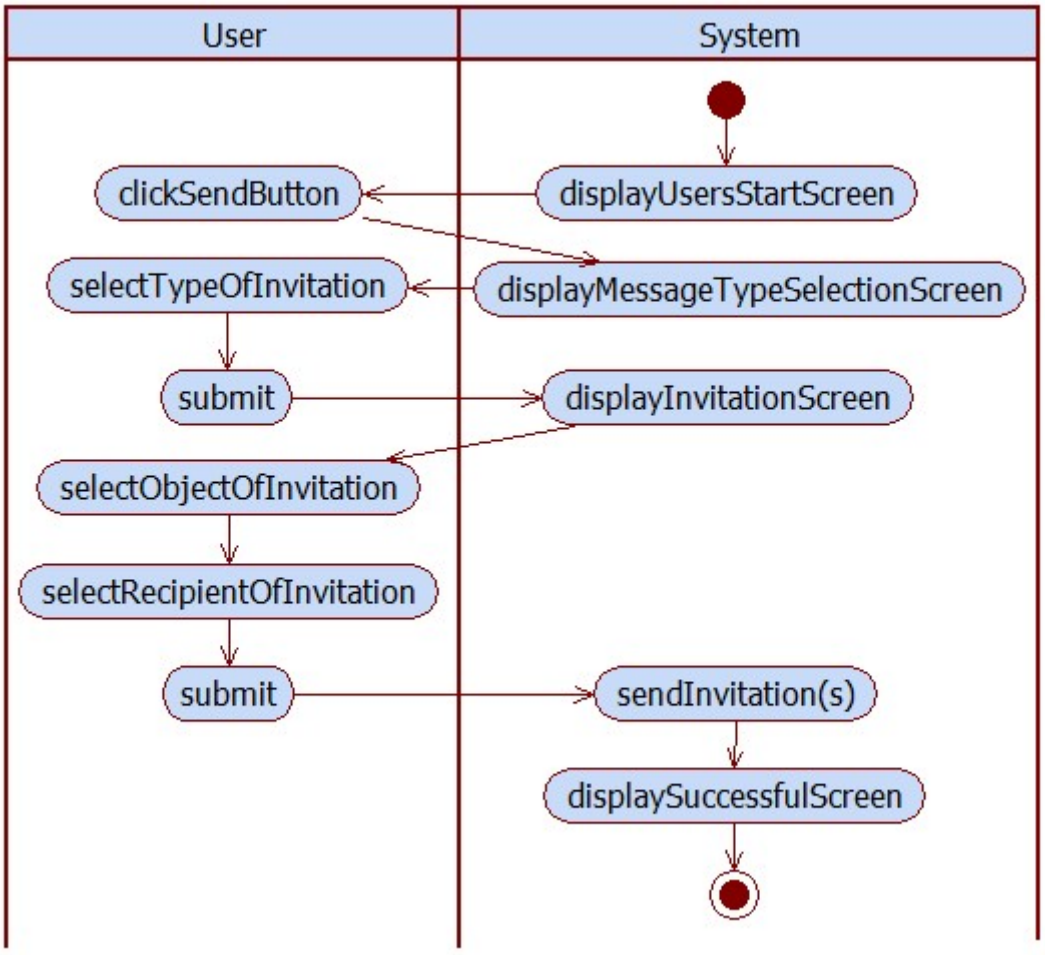

Figure 23: Activity Diagram – Send Invitation

2.7.3.2 Respond to invitation

If the user clicks the "invitations"-button on the start screen, the system displays a list of all pending invitations. By clicking on it, the details open. Here the user may either ignore or accept each invitation. On the latter, the system adds the user to the objects participants list and displays a notification about that fact.

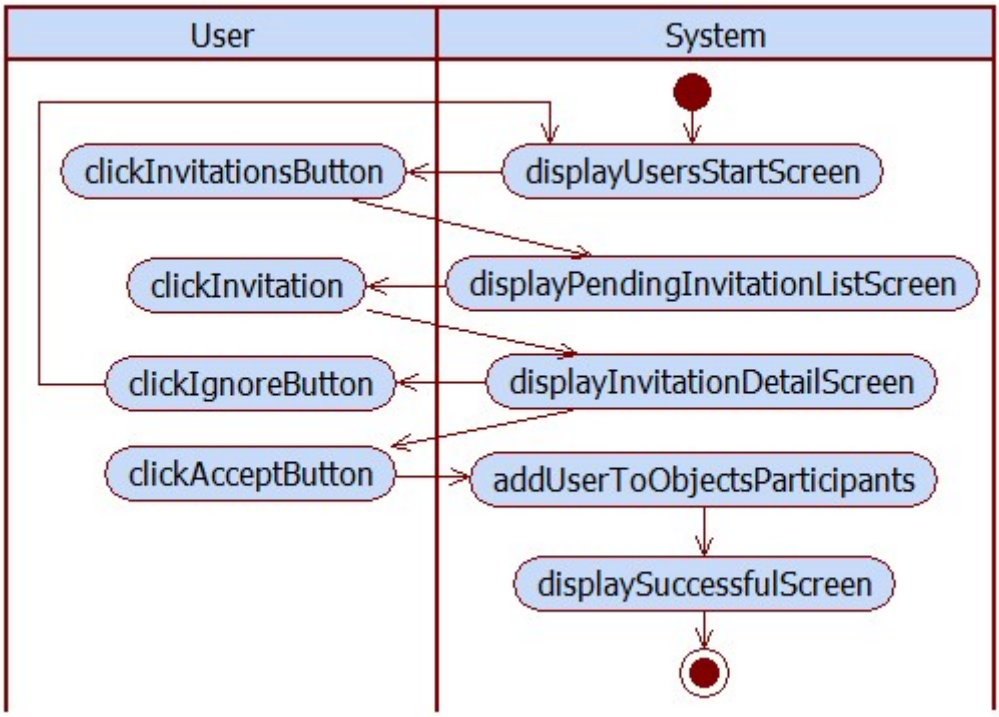

Figure 24: Activity Diagram – Respond to Invitations

2.7.4 Comments

The user can comment each of the objects in the platform. These may be groups, events, intergenerational activities or content generated by other users. Therefore, any of the objects has a corresponding button attached. If the user clicks on it, they are prompted for the comment. If they submit it, it is immediately published and shown on the objects detail page. The owners of the objects are able to delete unwanted or inappropriate comments.

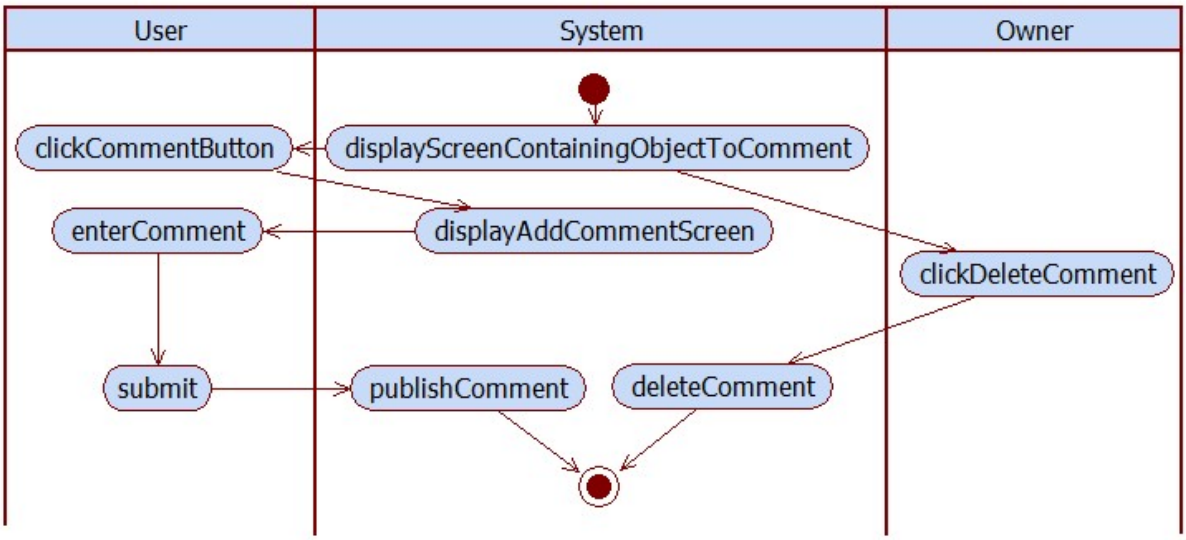

Figure 25: Activity Diagram – Comment

2.8 Simple search

The user has the possibility to type the keywords they search for into the search field on the start screen. On submit, the system performs the search and leads the user to the results page where the results are displayed. The system indicates if none exists. The search field with the keyword in it is displayed on top of the screen. If a result is clicked, the user is led to the page containing the result.

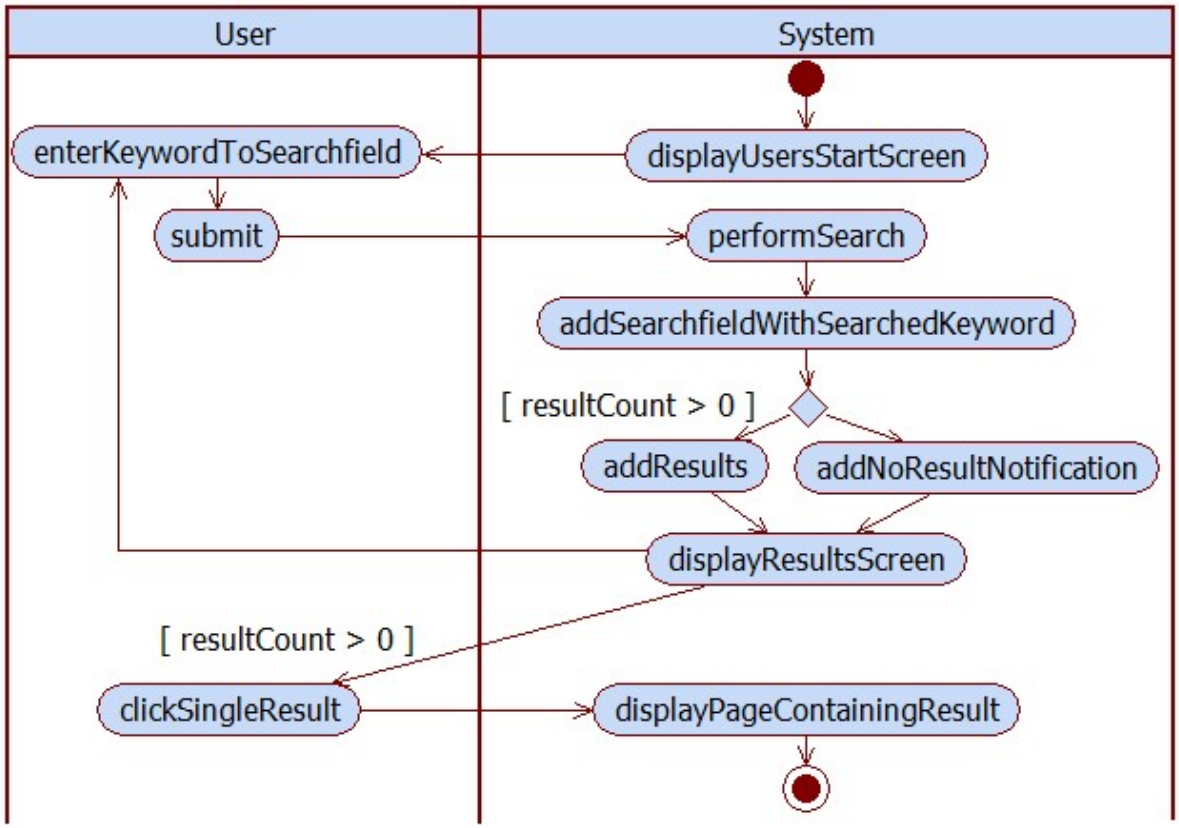

Figure 26: Activity Diagram – Simple Search

3. Games for the Elderly

3.1 Types of games – pros and cons for both user groups

The types of the games that are going to be developed can be categorized according to the following structure:

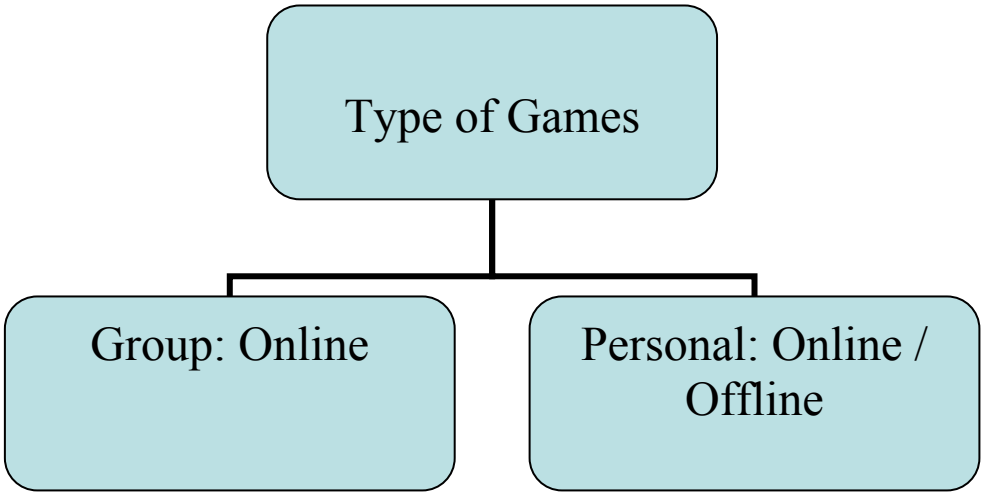

Figure 27: Categorization of games

The first categorization, as it is depicted above, is between '*group games*' and '*personal games*'.

- **Personal games** are those games, which are practiced by only one person while this person has to cope with the various levels of the game based on the obtained ICT skills and the cognitive situation that the user has. A further classification of these games is the either fact that they can be *online* or *offline,* whether there is need for Internet connection or not. **Online games** can be exercised only in cases that the user has Internet connection and in most cases are accessed through a web browser. On the other hand, **offline games** are those games for which the user does not need to be connected to the Internet.
- **Group games** are the games that are exercised within a group of people and not only by a single person as two or more users can participate in such a game. Group games can only be *online* and can be accessed by a browser as the participants are connected from different places.
- A last distinction can be **cognitive game** or **general game**, which is going to be analysed in the next section. A fundamental point that should be mentioned here is the fact that each game covers distinct needs of the user, the satisfaction of which is of major importance.

The users are allocated between two major groups, the first one is 55-70 years old and the second is 70+ years old. Users in the first group may have problems of depression and other stress problems while in the second group it is more common to have problems of mild dementia. For this reason, games should be developed in order to satisfy the needs of each user group taking into account the personalized requirements. In this case, it should not be

disregarded that there are pros and cons for both user groups although on the other hand, it is undeniable that the advantages outweigh the disadvantages.

First, the major advantages that accrue from the use of games are the training and the practice of the mind, which results to enhanced cognitive learning. Moreover, in case of group games the users interact with other participants, which support social and emotional activation. Not only recreation and entertainment but also cognitive skills are gained. Additionally, the observation of what happens during game playing represses depression problems.

On the opposite, there are not many disadvantages for the elderly to play games. Nevertheless, a basic point that should be mentioned here is the fact that the level of the game should comply with the users' skills level otherwise it may discourage the user.

3.2 Specification of games / cognitive vs. general

The games that are going to be developed are specified through cognitive or general characteristics in order for the elderly to undertake cognitive training exercises and social interaction activities, in order to act in a motivating play environment empowered by the ICT technologies.

In this direction, as it was previously mentioned, games can be classified into cognitive games and general games, taking into account the distinct characteristics that each category has and the special objectives that they serve. **Cognitive games** are meant for providing ergonomic motivating and pleasant cognitive training as playing among a wide range of games targeted to one or more cognitive skills. This type of games has extra benefits to medical experts and institutions as well, due to the fact that cognitive training scores and assessment scores give an integrated view of the patient. Additionally, an easy way for structuring and keeping track of cognitive training sessions is provided to the medical experts. Furthermore, cognitive games help the elderly to mobilize and improve their mental state in a constructive way.

More specifically, cognitive games can be divided into subcategories of games, each of which provide a variety of advantages achieving improvement of specific cognitive skills offered to a certain group of users and have specific duration. In this direction, elderly users have to memorize objects and put them in the right order or the user has to memorize and find the pairs that are randomly dealt in the screen. Moreover, the user has to hide various objects, then try to remember their positions or to memorize various patterns of a design, and then try to recreate them. The aforementioned games serve to memory improvement.

Another category of games can improve executive functions where in more detail the user has to choose the answer that best describes the similarity or differences between the pair of words/figures or select the answer that best completes the analogy and sort of pictures. Puzzles or copy of certain figures that are presented to the user can also enhance cognitive skills.

Except for the previous games, there are also those, which practice the attention of the user by finding a specific person based on the clues that are offered or finding the right direction of a map to a certain destination. Logical reasoning can also be practiced through completion of grids by choosing the correct figures that best completes a pattern or through Domino matching and symbol addition by calculating the number and type of symbols that exist in the pattern.

Other cognitive skills that can be enhanced through the use of these games are language skills, e.g. the user has to find the synonyms or antonyms for every word creating pairs of words. Orientation can also be practiced by creating games where the user will have to reach to a specific room within a house as fast as possible without bumping into furniture or remember the countries of a journey in e.g. Europe in the right order. Another very important cognitive skill that has to be practiced is memory, e.g. in the game the user has to memorize the melody of a song

On the other hand, **general games** try to serve and improve social activation and inclusion of the users playing in groups along with other participants. This category is also quite fundamental as it provides pure amusement and recreation to the participants who are satisfied when a level is completed.

3.3 Specification of UIs

3.3.1 Games for Web interface

In full accordance to what is written in D2.1 chapter 4 "User Interfaces", we introduce a few preferable "specification rules" concerning games:

- The main colour of the UI should be blue or blue tint, in accordance to the logo's basic colour, but no restriction should be applied concerning the game applications.
- Buttons and any rectangular containers of the game applications should have rounded corners.
- The 'Games' title should be part of the platform's main services and it could appear vertically on one side of the platform. It should follow the default specifications of the services (fonts, font-size, colour, etc.).
- In a second level, the games categories/types should be expanded, so as the user to locate or navigate easily. Each category would potentially have a number of games belonging to it, which all should be linkable to directly lead to the application. It would be preferable if the links appeared as graphical square buttons with a textual title, containing the logo or a screenshot of each game.
- In all stages prior a game selection, the search function (text field) should be available for the user to search games.
- When a game is selected, then there should appear a generic game menu with mandatory functions.
  - Start New Game
  - Instructions
  - Pause Game
  - Resume Game
  - Exit Game
- In specific cases, depending on the nature of the game application, other game options may be applied (Save Game, Enter Code, etc.).

- In group games the user should be able to send messages to other users.

3.3.2 Games for tabletop

Elder-Spaces aims at utilizing new technology to promote its goals. Such technology is the tabletop PixelSense device. It is an ideal platform for creating games for the elderly, as it utilizes an intuitive multi-touch tactile interface, allowing users to interact with the system in a natural way. For the games application, we are going to use this device in order to provide a novel and entertaining experience for the elderly.

3.3.2.1 Reusable framework

In the following figures, we present the reusable framework for games. Regardless of the actual game, its rules, game play etc.; all games have a common interaction before and after the play. There will be a navigation bar to select from a list of games. Since there are only going to be a few games as part of this project, it is not convenient to divide them into groups from which the users may select what they wish to play. Instead, we are going to present them in a flat hierarchy. This main navigation component will have a first level where all the available applications in the tabletop will be presented. From there, by selecting 'Games', the user is presented with a new ribbon that displays all the available games.

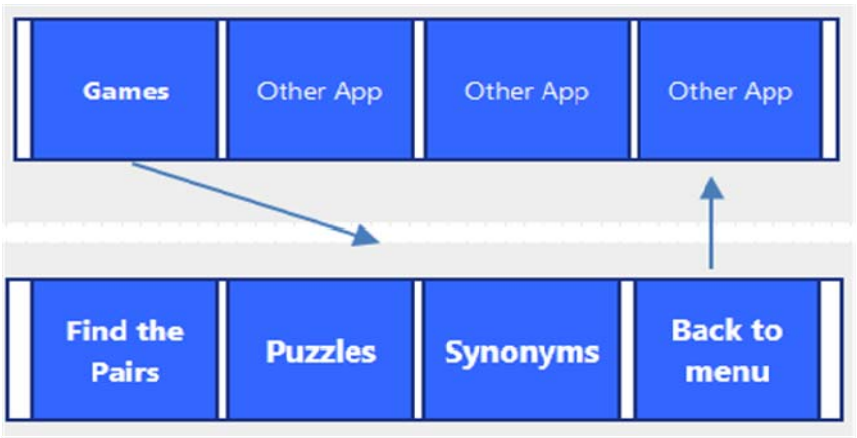

Figure 28: UI Storyboards – Games: Main Navigation (Tabletop)

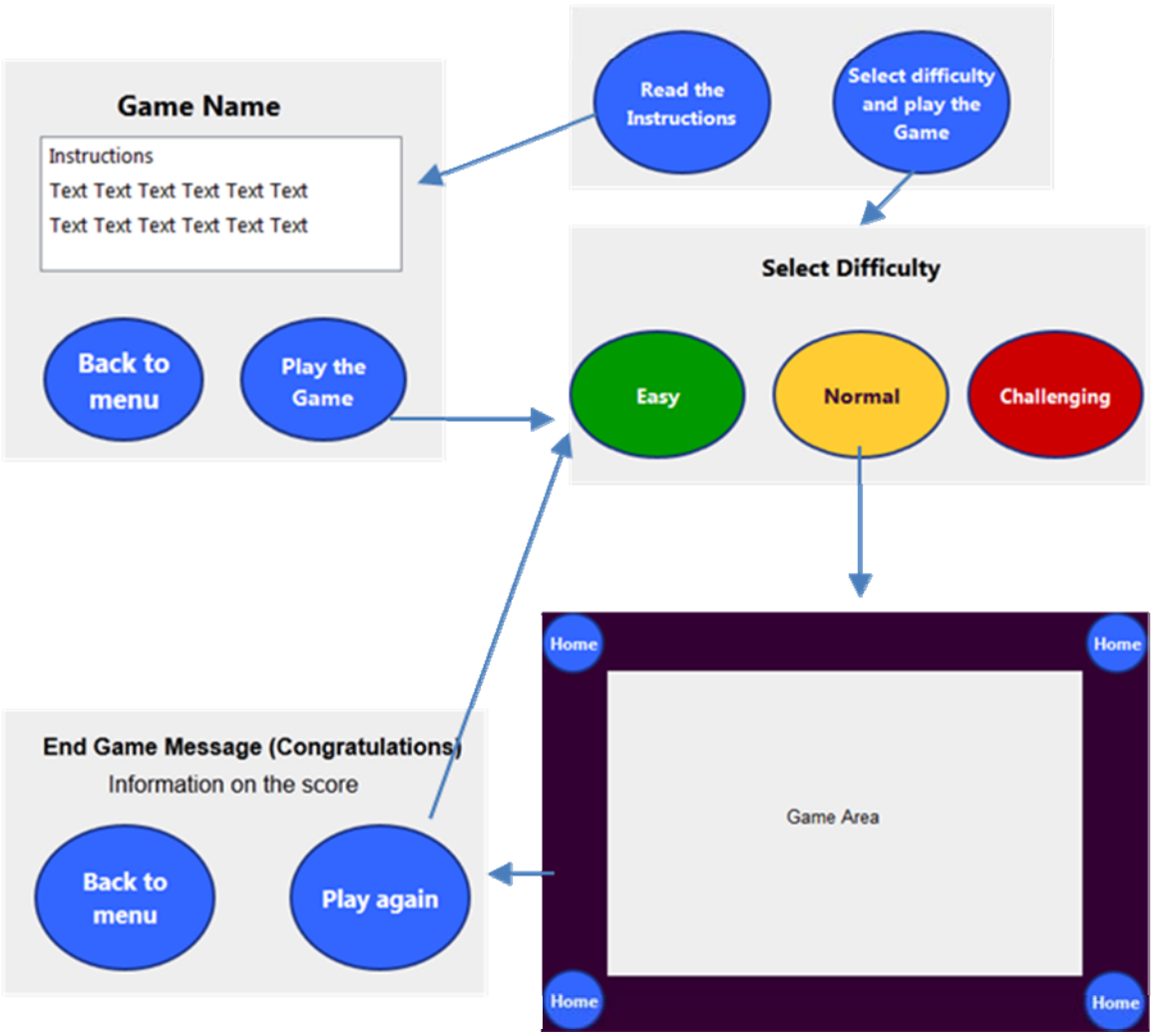

Figure 29: UI Storyboards – Games: Internal Navigation (Tabletop)

After selecting a game, the user goes through a series of similar screens, in order to read instructions on how to play, select the difficulty level and finally, see their score and decide to play again or go back to the main menu.

The game starts in a predefined area of the available screen. In the corners of the reserved area (black space in Figure 29), there are four icons that allow the user to exit the game and go back to the games menu. The buttons will be 20 mm in diameter and there will be minimum 50mm space between them and the game area, so that they do not interfere with game play and do not trigger by accident (the drawing above is not in scale, it just demonstrates the different components.

3.3.2.2 Tabletop games

Although all games share a common interface, before and after the game, the actual game screen differs between games. We present a draft image of the selected three games:

Find the Pairs

A number of cards will be displayed in a tabular format. The number of cards increases with the difficulty setting of the game.

First, the images of each card will be displayed, and then they will flip and the user will see their backside, hiding the images. By selecting two cards, the user tries to find a pair with the same image.

The game ends when all the pairs are removed from the board. The user then receives a congratulations message along with the time it took to clear the board.

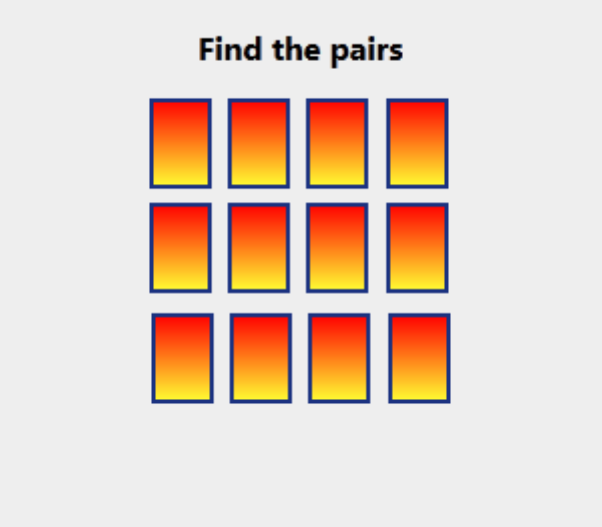

Figure 30: Games – Find the Pairs game layout

Puzzle

The user selects an image from a collection and then tries to complete a puzzle based on that image. The number of pieces increases according to the difficulty level. Navigation between the two screens is done by touching the desired image.

At the game screen, initially all pieces are scattered around the empty image and the user drags them to complete the puzzle. There will be no need to rotate the pieces.

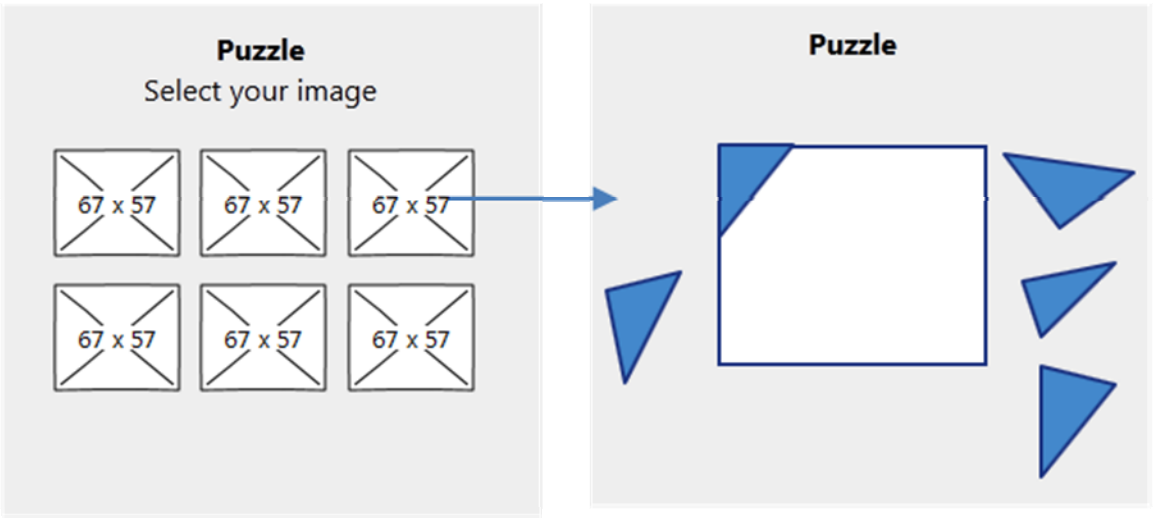

Figure 31: Games – Puzzle game layout

Synonyms

The user sees two sets of words listed opposite to each other. The aim of the game is to find pairs that mean the same thing. Pairing is done by linking two words from opposite sides by a line drown using the players finger, as it is dragged on the tabletop. Matched words are removed from the gaming board.

The number of words is increased in accordance to the difficulty level. When the player matches all the words, they get a congratulations message and the time it took them to complete the game.

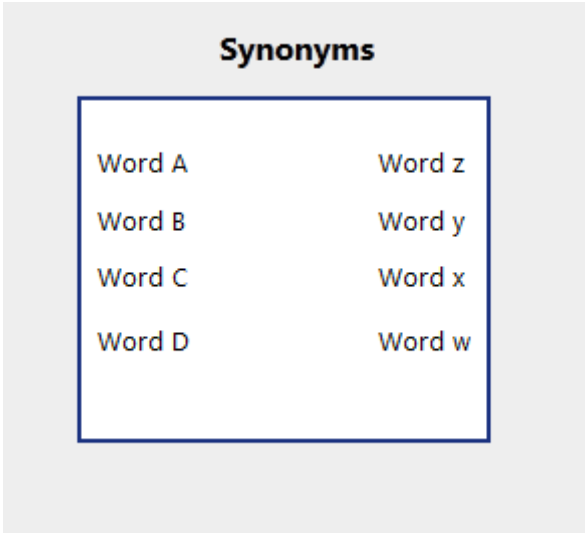

Figure 32: Games – Synonyms game layout

3.4 Technical aspects – login, personalization, profiling, messaging

3.4.1 Login

From a technical point of view, games are differentiated by the medium they are designed for, web or the tabletop device. Web games need to be selected and added to the profile of the user. Tabletop games are slightly different, in the sense that they are played usually in the presence of others, since they will be placed in day care centres and several players may play simultaneously. Requiring linking these games to the user's profile is not necessary in this case.

Table 1: Login related characteristics of Games for web and tabletop

Characteristic	Web Games	Table top Games
Login Required	■	■
Authorize game to access user's data	■	
Send Notifications	■	■

3.4.2 Personalization – internationalization

There are two principal issues that govern game personalization, the selection of difficulty level and of language. As some games are text based, it is important to support multi-lingual content. Table 2 summarizes these characteristics.

Table 2: Personalization related characteristics of Games for web and tabletop

Game	Difficulty Level	Language
Find the Pairs	• Easy: 12 cards • Normal: 16 cards • Challenging:20 cards	• UI will be adjusted to user's native language if supported else English
Puzzle	• Easy: 12 pieces • Normal: 20 pieces • Challenging:40 pieces	• UI will be adjusted to user's native language if supported else English
Synonyms	• Easy: 8 pairs of words • Normal: 12 pairs of words • Challenging:16 pairs of words	• UI will be adjusted to user's native language if supported else English • For each of the supported languages, there will be a different set of words to select from

3.4.3 Profiling – messaging

Scores and successes in games can be posted on the user's profile, as notifications from the games they play. Using the standard notification functionality provided in open social framework, games may send notifications to the user's profile.

3.4.4 Common game API – tabletop

As mentioned in section 3.3.2.1, games may have different implementations on the actual game play, but they share most of the functionality necessary to start and to finish a game. These functions will be packed in a Games API specific for the tabletop device. The provided functionality will reduce the necessary effort to create new games and will also provide the required uniformity and compliance to the Elder-Spaces UI requirements as presented in Deliverable D1.2.

This API will implement the functionality shown in the internal navigation screens (Figure 29). Besides the API, a standard screen template will also be implemented to be used by all games in combination to the API.

Table 3: List of reusable screens for Games

Template	Description
Select Instructions	This is the first screen, the user needs to decide if they will read the instructions or proceed with selecting the difficulty level to play the game
View Instructions	Present the instructions of the game and options to navigate. Instructions has to be a resource file provided by all games
Select difficulty	Allow the user to select the difficulty level. There will be three difficulty levels 1. Easy 2. Normal (Default value) 3. Challenging Difficulty level will be passed as parameter to the game (possible values 1, 2, 3)
End Game Screen	Displays the game results and allows the user to select between a new game and returning to the Games menu. Results are passed by the game in XML format

Below we present the different functionalities that need to be supported by the API

Table 4: List of desired functionality for Games API

Functionality	Parameter	Description
Instructions	Language preference	Redirect to instructions screen and load instructions resource file
Set Difficulty		Redirect to select difficulty screen
Start Game	Difficulty level	Redirect to game board applying the difficulty level provided
Back to menu / Home		Close screen and redirect to main navigation (Games)

The detailed specification of the API will be presented in Deliverable D2.3.

3.4.5 Workflow

The following diagram shows the workflow for the shared UI on games.

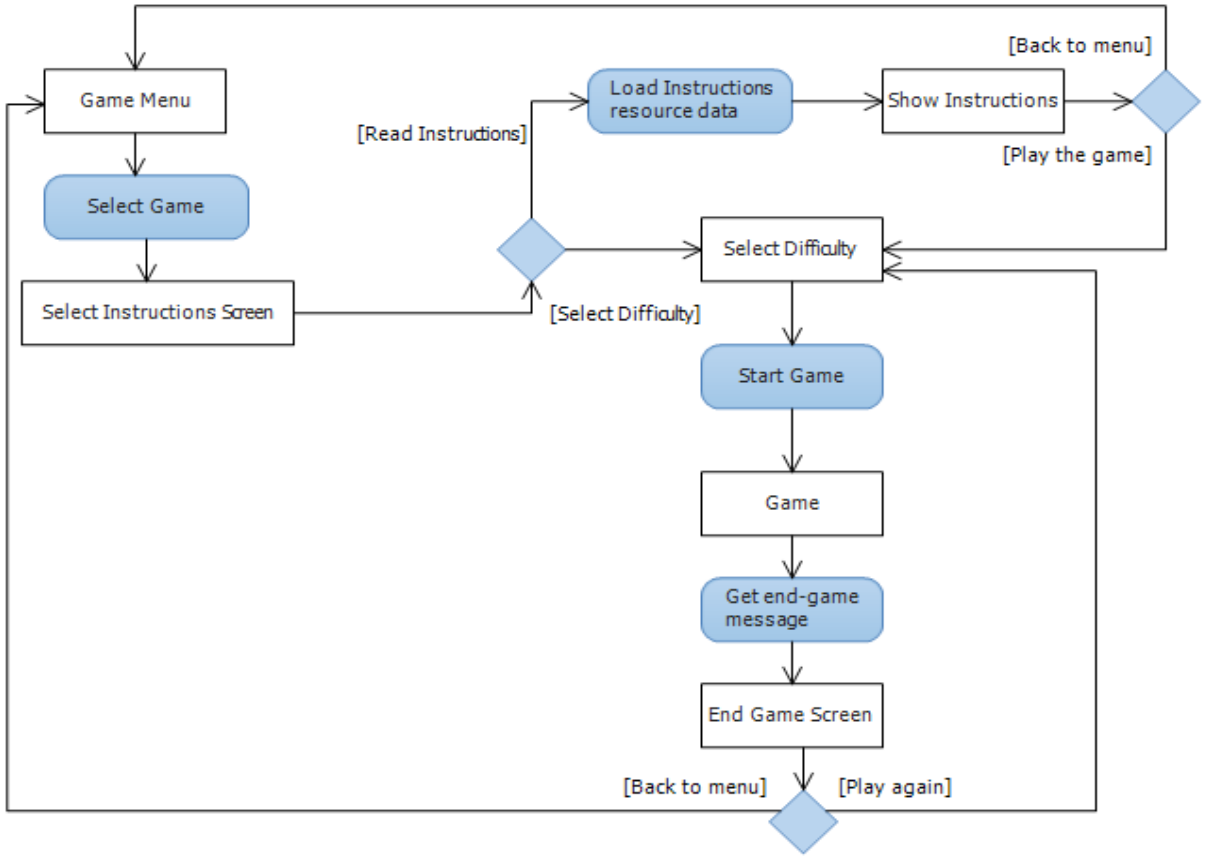

Figure 33: Workflow on shared games UI

3.5 Expected social impact

3.5.1 General considerations

Considerations regarding the motivation and the possible individual impact to the elder users in playing digital games are already done in deliverable D1.2 of the Elder-Spaces Project.[2] The listed motivations are mainly fun and relaxation, but even the possibility to escape from sorrows and reality, skill improvement, gaining pride by meeting challenges, keeping in touch with the society, to fill the day with meaningful activities and to exercise the brain and the reflexes. An additional motivational factor is training others in playing a game leading to additional social interactions.[3]

Furthermore, it is stated that games have positive effects because of training of memory, logic, reasoning, problem solving skills, hand-eye coordination, dexterity and fine motor abilities, and even because of stimulating social interaction and participation.

3.5.2 Impact on individual health situation and well-being

The training of motoric and cognitive skills will achieve an alleviation of age-related impairments resulting in increased independence and a lesser need of care, which will last the elderly longer at home and lead to an improvement of the situation for residents and employees of care facilities.

The elderly will gain self-esteem by getting better in the games, reaching goals and successfully mastering levels. The range of emotions triggered by success and failure and the possibility to escape from boring reality may prevent depressive disorders.

By implementing educational content to the games, the elderly as well as the users in general may gain knowledge and skills, e.g. concerning their own health conditions like diabetes or ischemic heart disease, helping them to get better understanding of it, to handle it and thereby to live in a healthier way.

Games can also be used as a non-invasive diagnostic tool for early detection of changes in mental status.[4] Thereby early intervention can be provided, which raises the chances of a positive outcome. This way the needs for medical treatment may decrease, reducing the costs for the health system and improving the quality of life for the elderly gamers.

3.5.3 Impact on socialisation and community

If a game is played by a single player, others may sit around, give comments and plan their own session. Moreover, even outside of the game sessions the elderly will talk about their experiences during gameplay and plans regarding the next game session.[5]

Multiplayer gaming offers more options. Online games can be played with the relatives or other external users enhancing the frequency and quality of intergenerational contacts. The choice of the games to play in multi-player sessions leads to discussions and fosters the group dynamic.[6] Possibly, also teams will be established in a sportive manner. They can form in many ways, e.g. by interests, by age or by location. In addition, leagues for different games are conceivable.

Especially for institutionalized persons this will struggle boredom, enhance communication and build a stronger community feeling. Some sources in the Internet currently report of Wii-bowling-teams wearing self-designed and created team-shirts and hats.

This may guard against senior-to-senior bullying. On the other hand, struggles for the devices or envy because of differences in skill may enforce competition among the residents.[7]

Even problems to get the people away from the games may arise or, in the worst case, single users may get addicted to playing games.

3.5.4 Impact on economy

Playing digital games may decrease the level of computer anxiety and increase the overall usage frequency of ICT by elderly users. Thereby a demand for more games interesting and accessible for elderly people could come up opening the market for games especially designed for an old-age target group.[8] This would be an achievement even for younger users, who benefit from the easy to use interfaces and accessibility features.

4. Travel Memories

The Travel Memories application is a community (social networking) service that would stimulate the elderly users of Elder-Spaces platform to establish contact with one another through their travel memories, sharing them with others. Elder-Spaces events created for the memories would enable users to contact still unknown aged people not included previously in their circle of friends and acquaintances. The Travel Memories application can extend the Elder-Spaces platform to a collection pool of travel memories that would offer to aged users – by means of positive memories – a community experience rich in information.

Basic terms

Map: This is a graphical world map, the central view of Travel Memories application.

Countries: This covers the countries in connection with which the users can give their travel memories.

Travel memory: This is the experience itself that the user records on the map for a given country.

Travel memory type: It defines the type of travel memories that may be added (recorded) for a given country.

Traveling event: It is an event entity interpreted in the Elder-Spaces application. For each travel experience, one can create a traveling event on which various community (social networking) functions are available such as:

- Uploading of pictures
- Comment (contribution)
- Liking
- Invitation of friends (acquaintances) to the event
- View participants
- Send broadcast message to the participants
- Organize voting for participants of the event

Players

Visitor (viewer): By viewer, we mean the authenticated Elder-Spaces user who is currently using the Travel Memories application.

Acquaintances (friends): The term covers the viewer's circle of friends on the Elder-Spaces platform. Users who globally authorized the use of external applications on Elder-Spaces Platform can be accessed as the friends of the viewer.

4.1 Travel Memories for Web interface

4.1.1 Main site

My own main site

The main site is the opening view of Travel Memories application that can be accessed following the activation of the application. The central part of the site is occupied by a stylized world map where the individual countries are distinctly separated.

The user can select a country from the map with their mouse. By pulling the mouse over a country the name of the country is written out in "hover" status. When clicking on the country the window called "My memories about the country" appears.

A country may have four different colours on the map, depending on the type of travel memory the user has specified for the given country in the window "My memories about the country". The possible values are given below, broken down to travel memory types:

Serial number	Travel memory type	Map colour
1.	I was here	Blue
2.	I lived here	Claret
3.	I would like to go here	Green
4.	I live here now	Yellow

One shall indicate on the map with icons understandable for aged people as well if one of my friends has already recorded travel memory for the given country. By clicking on the icons, the window called "My friends in the country" appears.

Map functions

The following functionalities are available on the map:

- Three-level zoom function, assisting the elder users in finding smaller countries.
- Four-direction moving (animating) tool enabling the user to move the zoomed (enlarged) map. The moving is also possible with the drag and drop function of the mouse.
- Country search function making possible to narrow down the countries we are looking for. The function is implemented with "Auto complete" facility; therefore, the found countries automatically appear below the search field. By clicking on the name of the country, the window "My memories about the country" appears.
- Friends button – if it is pushed, the "Friends" window is shown.

Other's main site

When the user sees the main site through the data sheet of another user instead of via their own, then the view available for them is identical with that of the other user (Open social Owner view). In this case a button called "Jump to my own memories" button also appears, enabling the user to navigate back to their own view.

4.1.2 My memories about the country

Memories that the user would like to record in connection with the country selected on the map can be specified in the window called "My memories about the country". The user can also modify or delete their travel memories in this window. The four selectable travel memory types are as follows:

- I was here
- I lived here
- I would like to get here
- I live here now

I was here

If the user selects travel memory type "I was here" then the following fields are to be filled in:

- Year when they travelled in the country
- Description of memory, detailing the given travel memory
- Create Elder-Spaces event check box – if selected, the following additional data may be given:
  - Name of traveling event
  - Exact date of traveling event
  - Exact location of traveling event

When the data have been entered, the travel memory is saved and displayed on the map with the appropriate colour. If Elder-Spaces event has also been marked then the corresponding Elder-Spaces event is created in the background. The Elder-Spaces platform creates an "Activity feed" entry on the creation of the event according to the settings of the user, appearing on their message board. Thus, your friends can be informed about the newly recorded travel memory and the traveling event.

I lived here

Travel memory type "I lived here" is functionally identical to the "I was here" travel memory type with one difference. In this case, not only a year but also a year interval can be given for the travel memory. A final date may also be specified when an event is created.

I would like to get here

Travel memory type "I would like to go here" is functionally identical to the "I was here" travel memory type, only the wording is different.

I live here now

Travel memory type "I live here now" is functionally identical to the "I was here" travel memory type except that in this case no event may be created for the Travel Memory.

My friends were there

The function called “My friends were here” enables the user to specify who from their acquaintances were in the selected country in their opinion. This is the most powerful social function popularizing the application. The function displays a list of acquaintances that can be filtered by name and can be paged where the four travel memory types are shown in the form of buttons beside the familiar names. In this case, only the type has to be given, no other parameters are to be specified. By clicking on one of the travel memory type buttons, Elder-Spaces notification is sent out to the acquaintance with an appropriately worded message.

For example: According to John, you lived in Brazil. If this is true, indicate it in the Travel Memories application. By clicking on the notification, the acquaintance will access the Travel Memories application and can begin to record their travel memories.

4.1.3 My acquaintances (friends) window

The "My friends" window lists my acquaintances available on the Elder-Spaces platform. The principle of listing is based on what travel memories were recorded by them in the Travel Memories application.

The window has five tabs:

- "All" that displays those acquaintances of the user who have recorded any kind of travel memory type in the application.
- "I was here" that displays those acquaintances of the user who have recorded "I was here" travel memory type in the application.
- "I lived here" that displays those acquaintances of the user who have recorded "I lived here" travel memory type in the application.
- "I would like to get here" that displays those acquaintances of the user who have recorded "I would like to get here" travel memory type in the application.
- "I live here now" that displays those acquaintances of the user who have recorded "I live here now" travel memory type in the application.

If this window has been accessed from icon "Friends in the country" shown on the map then all above-mentioned lists are narrowed down (filtered) for the given country.

If the number of users to be shown on a tab is too high then paging function must be implemented.

By clicking on the name of a user shown in the list the application view of the selected user is presented.

4.1.4 General functions

Modify and delete event

Traveling event cannot be modified or deleted through the Travel Memories application, only on the adequate sites of the Elder-Spaces platform.

Admin (administration) interfaces

The following functions are available on the administration interface:

- Management and modification of country names
- Modification of Activity wording by travel memory type
- Modification of Notification wording by travel memory type

4.1.5 Upgrading possibilities

Introduction of new memory types

With the introduction of new memory types, the sharing of memories can be made more diversified. For example: I studied here. I went on a trip here during the weekend.

With whom I travelled here

Acquaintances who accompanied the user during the travel can be marked for travel memories.

The marked acquaintances would be notified of the marking. The introduction of this function would stimulate the spreading of Travel Memories application via the social network.

Marking of regions and towns

This function would enable users to specify more exactly, where they spent their time during the journey. Taking into account that this would result in much more crowded screens, reducing transparency for the aged users, the introduction of this function requires careful consideration.

4.2 Travel Memories for tabletop

4.2.1 General

Travel Memories will also be available through the tabletop device. Using the same underlying functionality, a similar application will be implemented to work in the PixelSense environment.

There will be some differences from the Web application, in order to take advantage of the abilities of the tabletop with respect to the touch interaction. In addition, there will be less emphasis on entering text, as the absence of a physical keyboard makes it unsuitable for entering large volumes of text.

4.2.2 Available functionality and UIs

The delivered functionality on the tabletop will be less than the respected one on the Web. Users will be able to view and comment Travel Memories, but not create new ones. Such a task would require adding new photos, which is not going to be easy, since the tabletop will normally be located in day care centres available to lots of users, and it will not be more complicated to bring photo files to add in such an environment.

The main functionalities that users will have in this version of the application are:

Map navigation

Users will be able to navigate the map using their fingers. As described in Deliverables D1.2 and D2.1, users will be able to move around the map, zoom in and out, rotate and select points in the map, which either have a travel memory or empty ones to create a new one.

Travel Memories will be represented in the map with pins, in much the same way, as the Web counterpart will do.

Friend selection / filtering

On top of the map, a ribbon will be visible, with all the user's friends. By tapping on a friend's name and/or photo, the map will show only that user's pins. The default user will be the one logged in the system. This way, we will reduce clutter on the map and it will be easier for elder people to understand what they see.

Viewing Travel Memories

By selecting (tapping) a pin, the content of the Travel Memory appears.

Users may read about the memory, browse through the photos and see comments about the memory

Viewing photos

By selecting (tapping) on a photograph, users may move it around, resize or rotate it and also see all comments on the photo and add their own if desired.

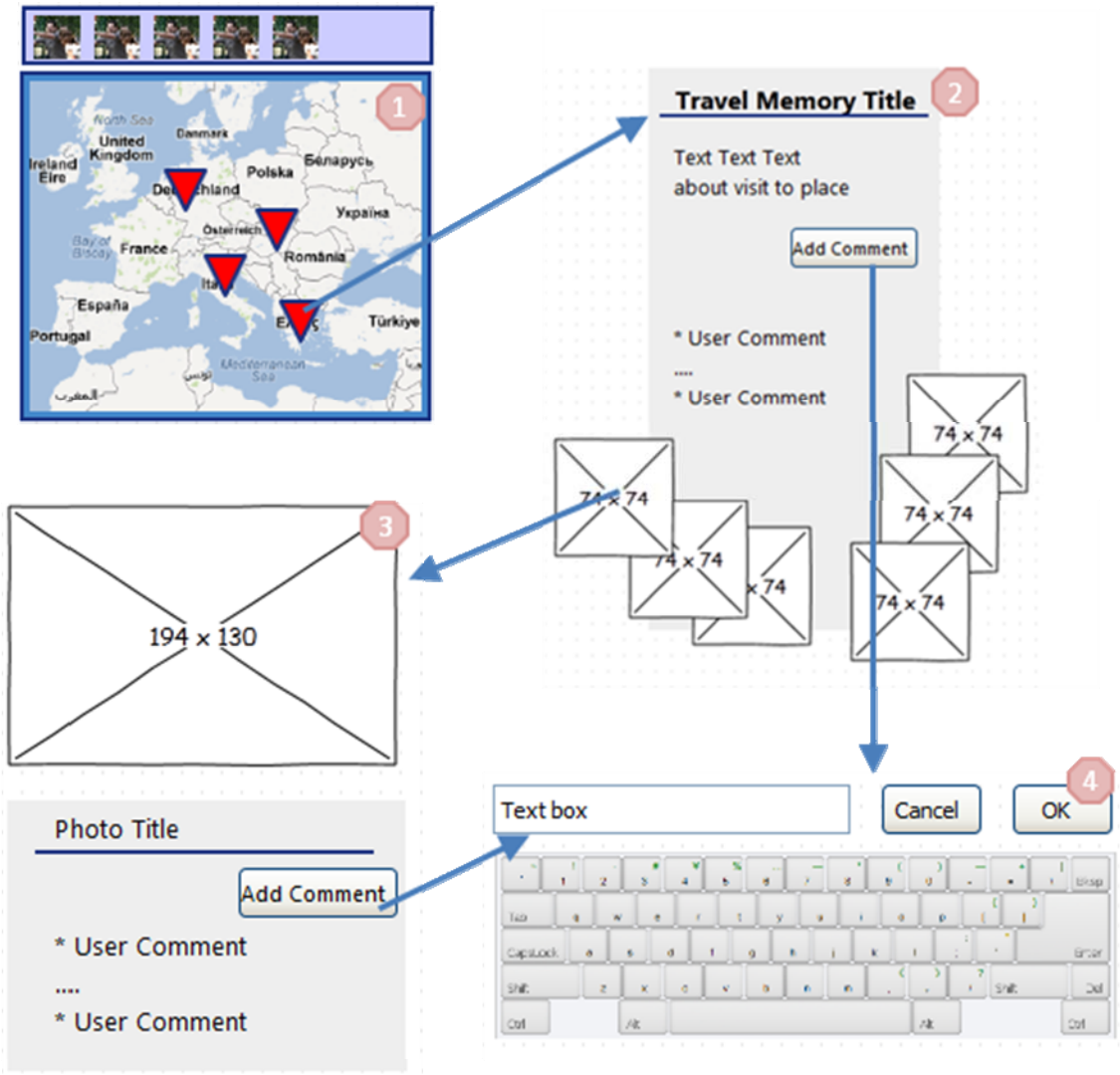

Figure 34: UI Storyboards for Travel Memories on tabletop

4.2.3 Detailed description of main screens

Table 5: UI description for Travel Memories on tabletop

Screen	1 (Map)
Description	This is the main screen of the application. It presents a map of the world centred in Europe. All existing travel memories are presented as pins on the map. Users see their travel memories pins or those of a friend. On top of the map, there is a ribbon showing the photos and names of the user's friends. By default, the user is selected and their pins are visible on the map. Users may navigate the map to isolate a memory pin, or reach a location to add a new one.
Components	Map and pin icons merged in a mashup

Functionality	• Friends ribbon
	  o Filter map: Select (Tap) on the photo and name of a person in the ribbon to see their pins on the map
	  o Navigate the ribbon: if there are too many friends, move the ribbon left or right by touching and dragging a finger on the ribbon to see more friends. Friends are ordered from left to right with the user who is logged in first (on the left)
	• Navigate the map
	  o Move around: use finger to drag the map to the desired direction
	  o Zoom in: use two fingers (or more) to enlarge an area of the map
	  o Zoom out: use the opposite gesture of zoom in.
	  o Rotate: touch the map in two points and rotate the image by moving one or both points in a circle. (it can be combined with a zoom in/out gesture as well)
	• View travel memories
	  o Select a pin: tap on a pin to make the memory details appear

Comments	When a travel memory pin is selected, the map screen gets smaller and moves to the left side of the screen, while the travel memory wall and photos appear in its place.

Screen	2 (Travel Memory)
Description	This screen appears when a pin in the map is selected. It presents two types of objects: • The travel memory wall and information, along with all user comments ordered with the most recent on top • All the photos in the travel memory album are shown as small thumbnails around the wall.
Components	Wall, button, text and photos

Functionality	• Photos
	  o Gather / Scatter photos. With more than one finger touch on the photos and either bring the fingers closer together or move in the opposite direction to gather the thumbnails to a pile or scatter the photos of the pile to see them more clearly and be able to isolate the desired ones to view.
	  o Move around: use finger to drag the photo to the desired direction
	• Text and Comments
	  o Zoom in / out: in the same manner described for the photos, text can be zoomed in and out

	○ Scroll: if there are too many comments, it will be possible to see more by scrolling on the wall of comments (in the same manner as "move around" functionality for photos – touch in one point and drag to the desired direction as if to roll the "paper" to see more comments) ○ Add Comment: if users desire, they may add more comments. This is done by pressing the Add Comment button. Then a virtual keyboard as described in Screen 4 will appear next to the travel memory and they can add a short text by typing on the screen.
Comments	

Screen	3 (Photo)
Description	This is the photograph screen. The photo is displayed, not exceeding the 1/3 of the available screen. Below the photo, any comments appear in reverse chronological order.
Components	Photo, button, text messages
Functionality	• Photos ○ Move around: use finger to drag the photo to the desired direction ○ Zoom in: use two fingers (or more) to enlarge an area of the photo ○ Zoom out: use the opposite gesture of zoom in. ○ Rotate: touch the photo in two points and rotate it by moving one or both points in a circle. (it can be combined with a zoom in/out gesture as well) • Text ○ Add Comment: by tapping on the "Add Comment" button, a virtual keyboard appears and in the same manner as described in Screen 4, making it possible to add a short comment
Comments	

Screen	4 (Virtual Keyboard)
Description	This is the UI for entering short messages on the tabletop. A virtual qwerty keyboard appears with a text box on top and buttons to accept input or discard it.
Components	Button, virtual keyboard, text box
Functionality	• Users may type on the keyboard by tapping on the keys • When the message is complete they either ○ Press OK to accept the text and then send it as a new comment ○ Or press cancel to discard the message and close the virtual keyboard.
Comments	It is possible to use a keyboard with a numeric pad on the right, but not necessary as default option in this context. Note that typing on the virtual keyboard is tiresome, so only short text messages should be written.

4.3 Technical aspects

4.3.1 Login

On the tabletop, users login with two alternative ways, either by username & password or by using their login card. Still, taking in mind that the device will be in a public place where other elder people will have access to it, it is not possible to be certain if it is the authenticated user who is interacting with the device or a friend who is sharing the experience.

There is no practical reason to provide for multiple logins in this application, as it would add more complexity to the users and most likely, they would render the added functionality obsolete by not using it. It is preferable to let users interact through the same account and let them enjoy the experience with the minimum amount of technical or systemic restrictions.

4.3.2 Personalization – profiling

In this application, we expect to have several individuals interacting and socializing over the Travel Memories content at the same time. From the system's perspective, it is not possible to be sure, if it is the authenticated user or any of the other people there who is actually interacting with the application.

As mentioned in the login section, there will be no multiple login functionality. Hence, the system is always assuming that the interaction is performed by the user who is logged in. In order to prevent unauthorized users to perform tasks that they should not have access to, the available functionality is kept to a minimum. In addition, several functions that would influence the travel memory information in a significant way are not available. The denied functionality is:

- Creating a new travel memory pin
- Edit/delete travel memory info
- Delete photos.

Table 6: Travel Memories (Tabletop) functionalities per screen

Screen	Function	Authenticated User
1: Map		■
	View travel memories pins	■
	Navigate the map	■
	Navigate friends ribbon	■
	Filter pins by person	■
2: Travel Memory Info		■
	View Info & wall	■
	Add Comment	■
	View photos	■
	Interact with photos Gather/Scatter, Move	■
3: View Photo		■

Screen	Function	Authenticated User
	Move	■
	Zoom in/out	■
	Rotate	■
	Add Comment	■
4: Add Comment		■
	OK	■
	Cancel	■

Figure 35 presents the actions workflow of the described application on the tabletop.

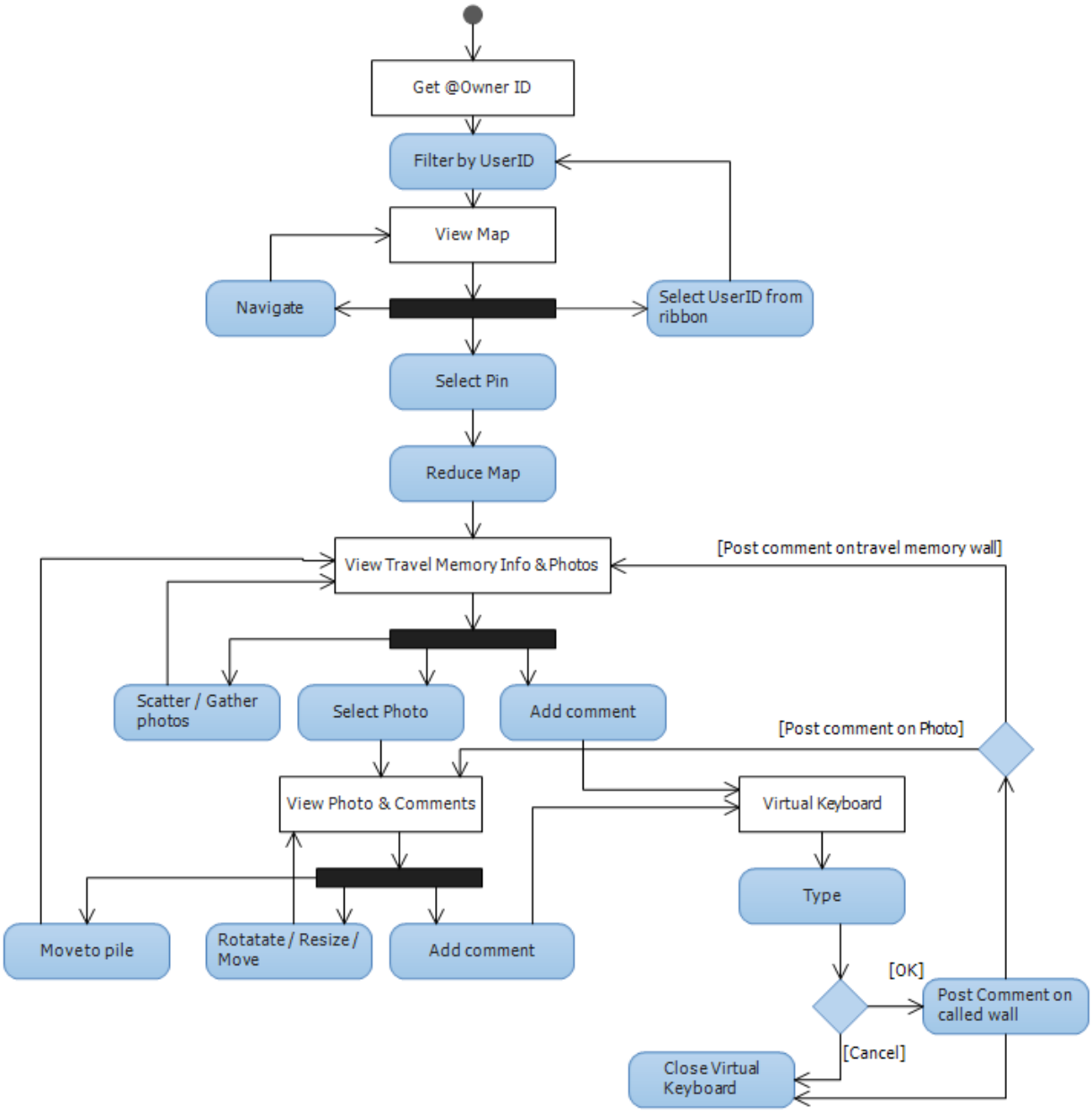

Figure 35: Workflow on Travel Memories (tabletop) UI

5. Intergenerational Activities

5.1 Definition of intergenerational activities

Because there is no consented definition of the term "intergenerational activity", an approach by defining the single parts of the term is done.

The prefix "**inter**" is used synonymously to "between".

There are some different approaches defining the term "**generation**" in contemporary sociology. Some social scientists used "generation" synonymously to "cohorts of the same age groups" or "in the same stages of life" or "in the same historical context". Others used classical kinship-relations like grandparents, parents and children to give a definition. One of the most influencing definitions is by Ortega y Gasset, whose *"concept of generation based on the notion that people born at about the same time grow up sharing an historical period that shapes their views."*[9]

The Merriam-Webster Dictionary defines "**activity**" as *"the quality or state of being active [or] a pursuit in which a person is active [or] a form of organized, supervised, often extracurricular recreation"*[10].

The Merton Council mentions that intergenerational activity *"brings together people of different ages - children, young people, adults and older adults - in positive, planned activities designed to bridge gaps between generations.*

It is an approach which can provide new ways of working to address a great many issues, e.g. health, learning, skills exchange, community safety and fear of crime, resolving disputes, cultural activity and heritage."[11]

In the context of Elder-Spaces, it can be concluded that "intergenerational activities" support people of different ages and sociocultural backgrounds in establishing and maintaining connections to communicate and conduct activities with each other.

For further clarification, the definition of "intergenerational practice" of the Centre for Intergenerational Practice can be used, because it follows the same aims:

"Intergenerational practice aims to bring people together in purposeful, mutually beneficial activities which promote greater understanding and respect between generations and contributes to building more cohesive communities. Intergenerational practice is inclusive, building on the positive resources that the young and old have to offer each other and those around them."[12]

Examples of intergenerational activities may be the conduction of meetings in schools where older people talk about their lifetime experiences regarding specific issues (war veterans, retired or active artists, professionals, etc.), the presentation of new technologies to elderly by younger citizens, tutoring lessons for the acknowledgement of how everyday equipment works (mobile phones, PCs, etc.).

It should be also mentioned that the intergenerational activities might be initiated either by elderly or by relatively younger users.

In the context of Elder-Spaces, many of the functionalities that will be provided to users can be viewed as "intergenerational" under certain conditions. Such an example is, groups concerning subjects that are of interest to both elderly and younger people, where both groups communicate and interact. In addition, multiplayer games, particularly those designed for the tabletop, played by both elderly and younger people, interacting in real life as they play, is another example.

Nevertheless, such functions, although they can bring together elderly and young people and promote understanding, socializing, transfer of knowledge and experience etc., are not organized activities intended to achieve those goals. What is lacking is the purpose; the organized intend to bring together people of different ages in a mutually beneficial activity, as mentioned previously in the definitions.

Such activities in real life are often initiated and planned by professionals in charge of caring for the elderly or the young. Such professionals may be social workers in day care establishments or teachers from schools, who understand the benefits from intergenerational activities and organize such events to promote understanding, the exchange of experience and help bridge the gap between the generations.

Elder-Spaces will implement a tool for assisting those professionals to plan and implement such activities. We emphasize on the professionals, but that does not exclude others from attempting to do similar activities. The involvement of professionals is necessary to ensure that those activities will truly be intergenerational and to promote even further socialization off-line. In this respect, professionals will be able to initiate intergenerational activities, similar to the event functionality of the social network. They will invite the intended participants and planning of the event will be able to be organized from the social network, as it is a convenient place to meet and exchange ideas and information. The actual activity will be off-line, and afterwards, participants will be able to further expand the experience, by sharing thoughts and photos of the event, continue socializing and even plan future activities too through this functionality.

5.2 Specification of UIs

In the images that follow, we present a draft version of the intended interface and the interaction that different screens will have depending on user actions. Note that these images isolate only the frame allocated for the application. For convenience, we do not present the complete interface with the site's navigation bar and external components.

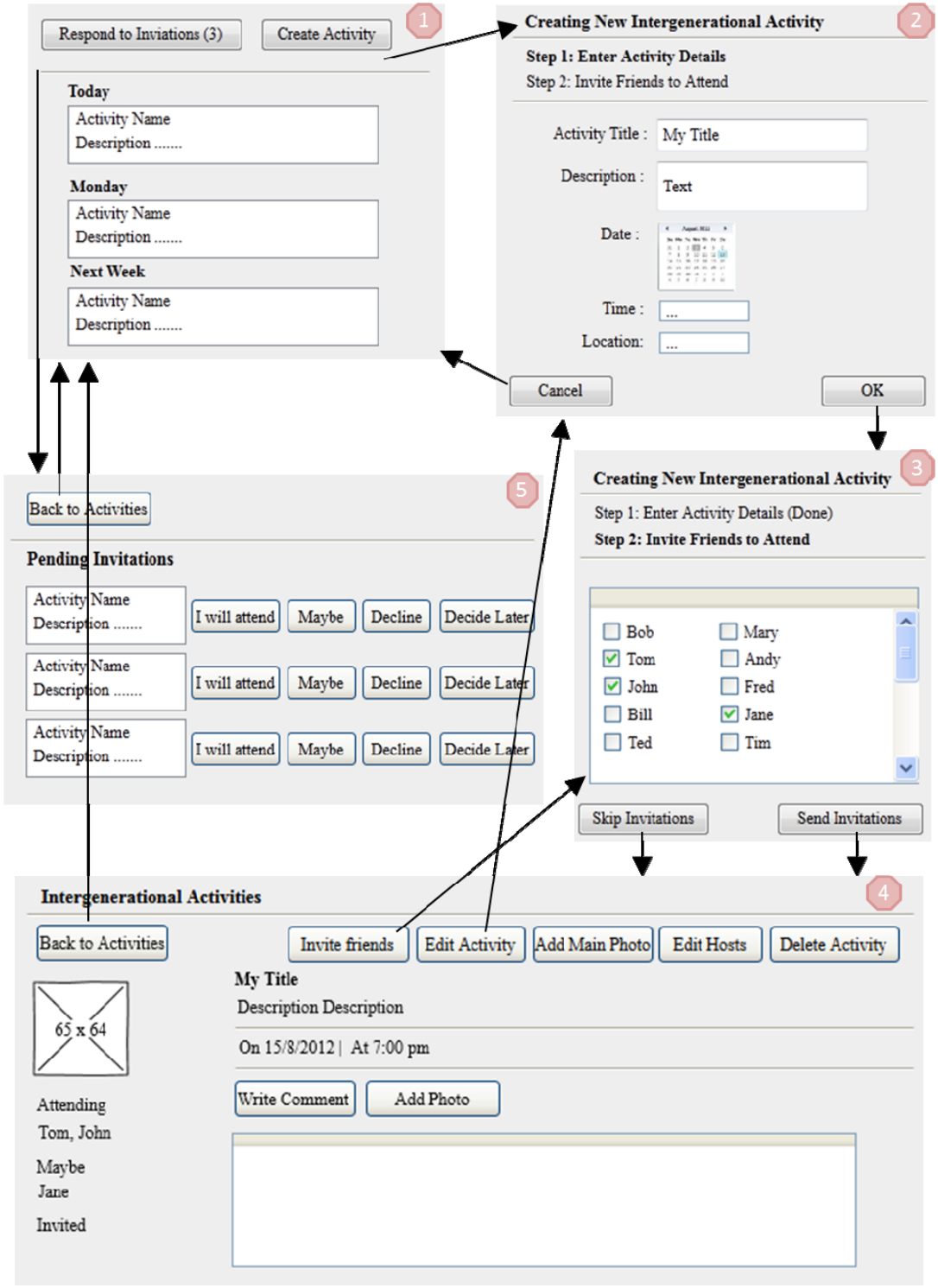

Figure 36: UI Storyboard – Intergenerational Activities

In Figure 36 the main functionality and sequence of UIs for intergenerational activities is displayed. The moderator can initiate the creation of an intergenerational activity, provide the initial necessary information about it and then invite people to participate. Once created, the intergenerational activity is presented, showing all available functionality on the top of the display.

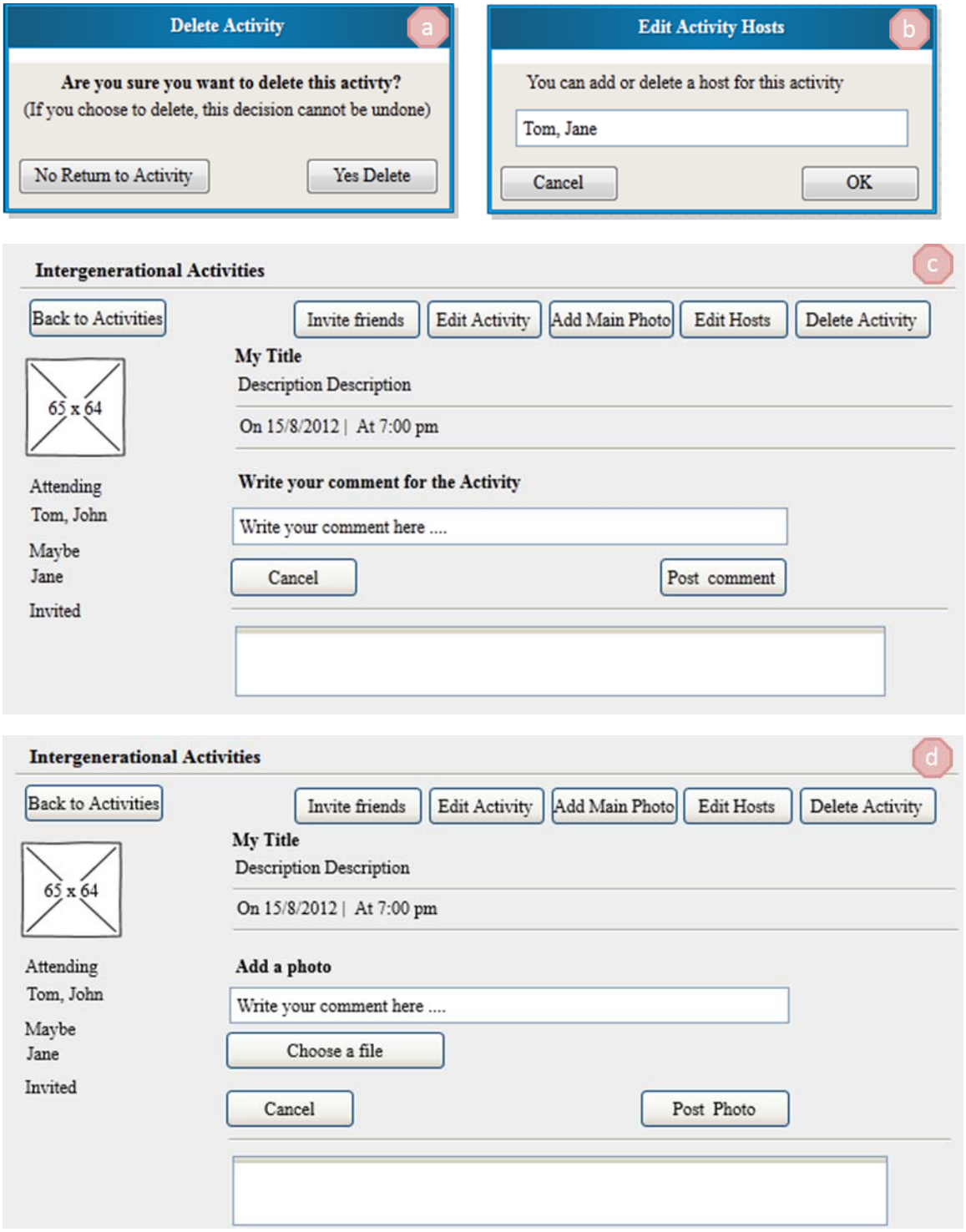

Figure 37: UI Storyboard – Adding comments or photos to Intergenerational Activity

5.2.1 Detailed description of main screens

This chapter presents a short analysis for each of the primary screens of the storyboard (primary screens are numbered, while secondary screens and screen variations are depicted by letters).

Table 7: UI description for intergenerational activities

Screen	1
Description	This is the initial screen for intergenerational activities. It presents a list of the user's activities. (Those that the user has created and any that they are invited and have not declined the invitation).
Components	Buttons, hyperlinks.
Functionality	• Create Activity: create a new intergenerational activity • Respond to Invitations (#): See all invitations to activities and respond about attending. The number of invitations is displayed in the button's label • View an activity: the user may click on one of the listed activities and see it's details
Comments	The user may also search for an activity. This functionality is part of the basic interface of the site and is not covered in the presentation of this application.

Screen	2
Description	This screen requires the user to input the basic details about the intergenerational activity. Besides the title, no other field is mandatory.
Components	Text boxes, buttons, calendar control
Functionality	• OK: The input is verified and a new intergenerational activity is created • Cancel: No activity is created, and the user is redirected to the initial screen
Comments	

Screen	3
Description	In this screen, a list of all of the user's friends is displayed, in order to select who are going to be invited to the intergenerational activity.
Components	Check boxes,buttons
Functionality	• Send Invitations: An invitation is sent to all selected friends • Skip Invitations: No invitations are sent
Comments	

Screen	4
Description	This is the screen for displaying intergenerational activities. All information on the activity is presented on the top. Below that, users can add comments and/or multimedia content. On the left side, there is a place holder for an activity photo and below that, the users that are invited to the activity are grouped by their invitation status (Attending, Maybe and Invited)
Components	Buttons, hyperlinks, messages display
Functionality	• Back to Activities: The user returns to screen 1 • Invite Friends: The moderator may send additional invitations • Edit Activity: The moderator may edit the activity details • Add Main Photo: The moderator may add a photo to represent the activity • Edit Hosts: the moderator may grand or revoke the Host role to other attending users for this activity • Delete Activity: The Moderator may delete this activity and all related content • Write Comment: A user may add a short text as a comment to the activity • Add Photo: A user may add a media item with a short description
Comments	When the Write Comment and Add Photo buttons are used, there is no transition to another screen. This screen changes to facilitate the user to add the new content as displayed in Figure 37. • Image a displays the Write comment functionality • Image b displays the Add Photo functionality. Both functionalities share the option for Posting the content on the activity or cancelling (using the Corresponding buttons)

Screen	5
Description	In this screen, a list of all of the invitations that the user received is displayed. Invitations with status invited are displayed
Components	Buttons, hyperlinks
Functionality	• Back to Activities: The user returns to screen 1 • I will Attend: Invitation status is set to "Attend", a notification is sent to the user's profile • Maybe: Invitation status set to "Maybe" • Decline: Invitation status set to "Decline" • Decide Later: Invitation status unchanged
Comments	After each of the user's selections, the referenced invitation disappears from the list, with the exception of "Decide Later"

5.3 Technical aspects – login, personalization, profiling, messaging

5.3.1 Login

Only authenticated users may access intergenerational activities. For all purposes, a valid login has to be used before viewing or interacting.

5.3.2 Personalization – profiling

In the previous chapter, the main UI screens were displayed and described from the perspective of the moderator, the user with the highest degree of control on this particular functionality. There are some differentiations on which screens are available to each user role and even differences in the available functionality those roles have.

Note that only authenticated users may have access to intergenerational activities.

In the following table, we present the different user categories that are involved.

Table 8: Summary of user Differentiations

User Differentiation	Description
Authenticated User	This is any authenticated user of Elder-Spaces, who has not received an invitation.
Authenticated User - Invited	An invited authenticated user who has not decided upon attending yet
Authenticated User - Attending	An invited authenticated user who is attending the activity
Authenticated User - Maybe	An invited authenticated user who may attend the activity
Authenticated User - Declined	An invited authenticated user who will not attend the activity
Moderator - Owner	This is the moderator who created the activity.
Host	An authenticated user who is attending and after consorting with the moderator, is elevated to Host status for this activity. (It is the equivalent of being moderator for this activity.)

Depending on the above-mentioned differentiations, each user may see a personalized version of the interface. Particular screens and/or functionalities are available only to specific users. Moderators are the only ones allowed to create such events, but they can elevate other users per particular event to act as “Hosts”, hence having increased functionality in the intergenerational activity, assisting the moderators in their task.

On the other hand, some functions do not make sense depending on the type of user. Users who have accepted their invitation and are attending do not need to see on the screen buttons for accepting the invitation. In the following table, we summarize the differences per type of user in the interface and the presented functionalities.

Table 9: Summary of user rights and UI Personalization per role

Screen	Function	Non Invited user	Invited User	Invited User (attending or maybe)	Owner or Host
1: List of Intergenerational activities		■	■	■	■
	Respond to invitations		■		■
	Create Activity				■
2: New Activity Details					■
3: Invite friends to Activity					■
4: Intergenerational activity display		■	■	■	■
	Request to Attend	■			
	Attend		■		
	Maybe		■		
	Decline		■		
	Leave activity			■	
	Back to activities		■	■	■
	Invite friends			■	■
	Edit activity				■
	Add main photo				■
	Edit Moderators				■
	Delete Activity			■	■
	Write Comment			■	■
	Add Photo			■	■
	Share Photo/Video			■	■

5.3.3 Notifications – messaging

There will be three types of notifications for intergenerational activities:

- Creation of an activity
- Change in invitation status to ‘Attending’ or ‘Maybe’
- Reminder of the activity on the designated activity date

5.3.4 Workflow

In the following figure, the detailed workflow with the user's options on navigating the UI is displayed.

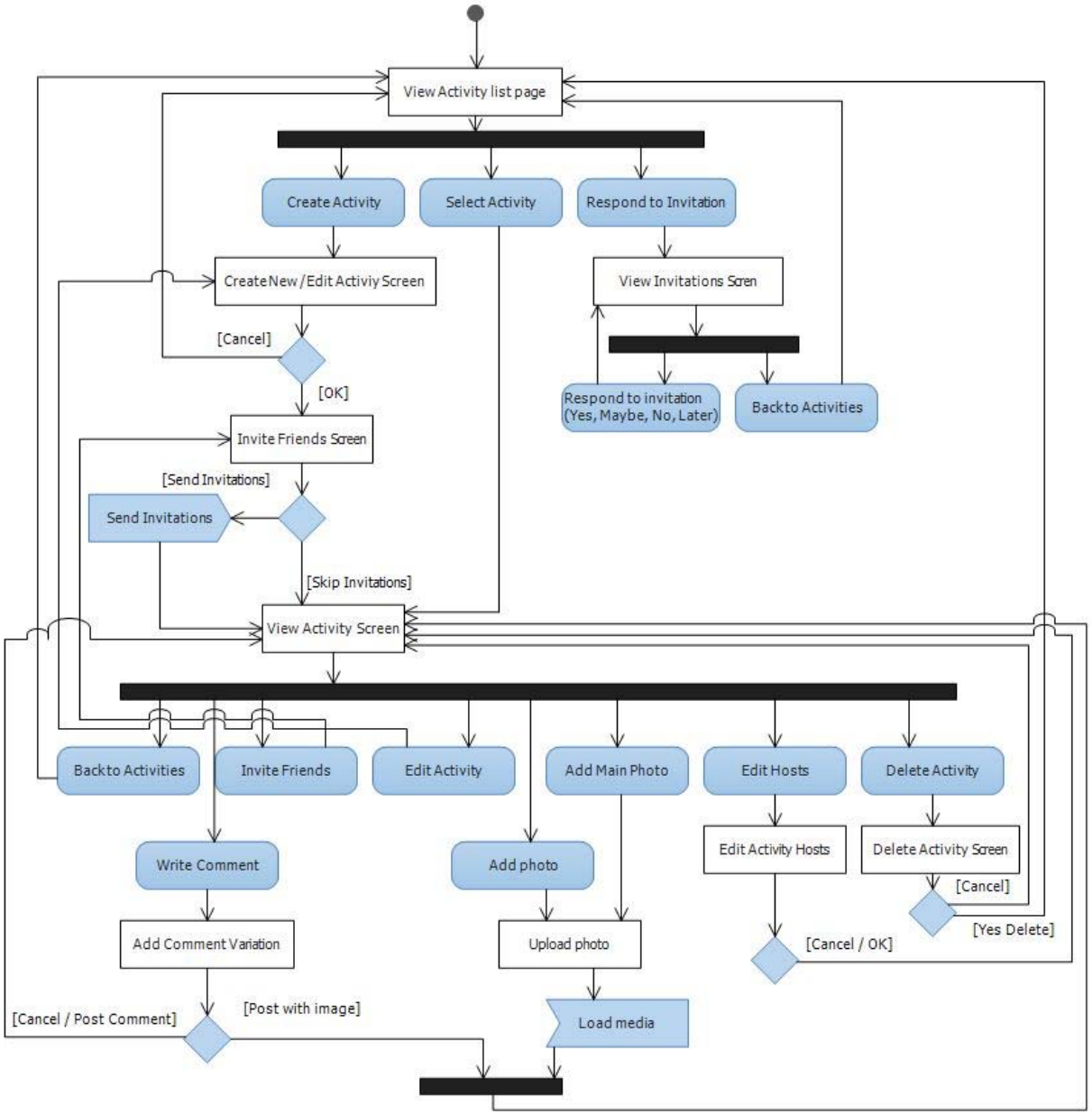

Figure 38: Workflow on Intergenerational Activities UI

5.4 Expected social impact

5.4.1 State of the art and general benefits

Currently there are some intergenerational activities offered by churches, social service providers, local municipalities and other groups. These intergenerational activities are mostly not conducted by the target groups itself. This may lead to some challenges, beginning with a lack of motivation because the interests are not met. Some of them cost money, which not everyone is able or willing to pay. If the intergenerational activity is an event, the choice of the location may lead to transportation issues and at least the termination may not suit. Some of the elderly may not even get the information about an oncoming event.

Interviews in nursing homes showed that some of the residents *"would like more social programs to be offered but would not try to organize social events by themselves."* [5]

Because of these issues, the main benefit is the generation of face-to-face contacts between older and younger people in the most suitable way. The participants will be highly motivated, costs can be minimized by voluntary contributions and the location and the date are self-determined. This may lead to an increased quantity of recreational, cultural and leisure activity offers for elderly and younger people at higher quality. Many additional benefits of intergenerational activities can be expected, to the younger as well as to the older users – and even to the whole society. Some of them are described in the chapters above concerning social impact, because playing games and visiting or conducting events possibly are intergenerational.

Bringing older and younger people together will eliminate prejudices and communicational barriers on both sides. By becoming acquainted with each other, a feeling for the particular needs of the other generation may evolve and foster voluntary activities by both sides[13]. By strengthening the social cohesion, the impact of negative life events will be lowered due to support by the community. Depending on the interests of the users the intergenerational activities may lead to a heritage of traditions, that otherwise could be forgotten. It applies to all knowledge that can be learned from elderly people like simple things as recipes, tips on gardening, old folk songs, traditional games etc., but even coping strategies for adverse life situations and mutual support can be exchanged. The generation of intergenerational face-to-face contacts could lead to mutual services like babysitting or reading service respectively household chore or shopping assistance, maybe even paid on a low level. If deep sympathy and trust grows, some intergenerational housing arrangements may form.

5.4.2 Intergenerational events

In the scope of Elder-Spaces, an event is defined as an action, which includes more than one user, is conducted in a specific location and contains a specific target.

The goal of an event would be to create a conventional event, using the offered functionalities of the platform online. The process may include the following steps: A user raises an idea and creates an event, the future event is planned, it is discussed in groups, feedback is extracted and evaluated properly, new arrangements are being done, and finally an event is born.

A number of distinct events have been identified, which include excursions, charities, volunteering, calendar events, hobby gatherings, general events, etc. Because the social impact

depends on the type of event, they are explained in the following.

Excursions

This type of event is considered as the most attractive for users. It may include a variety of destinations, such as archaeological sites, monasteries, excursions on natural landscapes (mountains, lakes, rivers, sea, etc.), national or international visits to other cities or villages.

The motivation could also be multi-level; leisure (summer/winter holidays), weekend escapes, religious incentives, cultural incentives, athletic incentives (visit to stadiums, courts or even watching games).

Charities

It is assumed that elder people are eager to be involved in charity events, as they are not only relatively sensitive but also can afford such a fact. The charities may concern the support of institutions (orphanages, hospitals, schools, non-governmental organizations etc.).

Volunteering

Another key type of events are volunteering events. There, the users will be able to offer their services in a variety of volunteering initiatives. They may include the conduction of cultural venues, athletic events, municipal initiatives, environmental actions (reforestation, cleaning of forests, beaches and municipal landscapes etc.), blood donation, where volunteers are required for their successful conduction.

Calendar Events

This specific type of events covers events, which are mostly based on the selection of a date in order to conduct it. Although all events should include a specific date, the main difference of this category is that the date is their main defining characteristic. For example, there could be created events concerning the World Day of Poetry or Against Racism. Furthermore, there could be created more events posing the prerequisite or consequence of other events.

General Events

Any other events, which are not described in the aforementioned categories, may belong here. Two examples could be the conduction of a “Backgammon Afternoon” or “Chess Afternoon” events.

A facilitated organization of trips will trigger motivation in travelling together, which increases independence, self-esteem and even communication, orientation and maybe language skills, but mainly provides a very pleasant leisure activity.

Even educational events may be organized, for example visits of courses provided by the local community college or themed evenings regarding historical events may be planned, where eyewitnesses have the opportunity to share memories and maybe to tell others about the past.

Regular events may be planned by groups to carry out cultural activities like to rehearse a play or meet to paint together, which may lead to open performances and exhibitions as special events. In this way, the regular group internal events create a new, public and also

intergenerational event. If the admission or the amount realized is donated, this could be a charity event, which could be used as an opportunity to generate public attention.

More public attention may be attracted by political events such as information evenings or panel discussions, which could be created involving all associated stakeholders using the Elder-Spaces platform.

Voluntary activities like visiting the animals of a local animal shelter can be planned, even regular, providing mutual benefits in this special case.[14]

The main objective of all social events is bringing the people together. Maintaining regular social contacts with people having similar interests prevents isolation and their consequences. Physical and mental health is strengthened, the risk of depressions and substance abuse is lowered, quality of life is improved, loneliness is prevented, the burden of the caregivers is decreased and finally premature institutionalization and death are prevented.[15]

To share the excitement and the satisfaction of overcoming possible challenges in teamwork will form a strong sense of community and long lasting deep friendship relations. The planning, organization and conduction of self-established events has a positive impact on the individuals by activating them more than the passive event consumers do and raising their self-esteem.

At least it has to be mentioned that even less positive events like the visit of the burial of a friend may be organized by using the platform.

5.4.3 Impact on younger users

Through regular contacts with senior citizens, young people may improve their behaviour and develop more respect to their selves and to other people, not only elderly. Furthermore, they may become thinking about a sustainable lifestyle and prevention of waste when they understand the feelings and experiences of people who suffered from undersupply in the past.

Even a deeper interest in global history, politics, ecology and finances may evolve making the young persons to more engaged and responsible citizens. The younger ones can also be preserved to avoid repeating historical mistakes, because eyewitness explanations that could be provided at schools are more interesting, intensive and impressive than the content of history books.

5.4.4 Impact on elder users

Elder people will gain self-esteem and meaningfulness of life when experiencing that they are accepted and needed. They may receive satisfaction while mentoring a younger person and notice the success of their efforts, but also will gain knowledge by learning new skills and may get support in their activities of daily life from the younger users. Fears, which may have arisen in part from prejudices, are eliminated. Maybe the elder users will do more activities that are physical and increase their fitness.

As stated above, many of the intergenerational activities are constituted of playing games and conducting events together. Because of that, additional benefits are listed in the corresponding chapters.

5.4.5 Impact on community and society level

The social impact on community and society level is an increased social cohesion, an improvement of the neighbourhood, the reduction of prejudices, enhanced attitudes about quality of life and more engagement in the citizenship.[15] Generation of better understanding between people of different ages will create a more harmonic togetherness.

Depending on the activities, the benefits may differ. The environment will be enhanced by cleaning and maintaining the neighbourhood, a raised number of cultural offerings and improvements of the infrastructure. By mutual learning, all participants have the chance to develop new valuable skills to use their full potential and to enrich the wealth of community knowledge. People will become more thoughtful and live in a more sustainable way, which may lead to lesser waste of resources and a lower production of rubbish. The quality of life of particular groups targeted by intergenerational voluntary or charity activities will be improved. Private provision structures outside of the traditional borders of the family will evolve when former strangers come to know and get to help each other. This will lessen the burden of professional social service providers, national welfare and social security systems.

5.4.6 Summary of the benefits of intergenerational exchange

The benefits mentioned above are complemented by the findings of an Australian research group as shown in Table 10[16].

Table 10: Summary of the benefits of intergenerational exchange

Older People	**Younger People**	**Community**
Get to spend time with younger people and combat feelings of isolation	Become healthier	Building social networks and developing bridges across the community
Increased self-esteem and motivation	Encouraging optimism, helping building strength during adversity and encouraging hardiness (ingredients for resilience)	Breaking down of barriers and stereotypes
Share experiences and have an audience appreciate their achievements	Access to adult support during difficult times	Challenge stereotypes
Reflect on earlier life experiences	Increased sense of civic and community responsibility	Encouraging and modelling civic skills
Respect, honour and recognition of their contribution to the community	Learn about history and the stories of others	Enhancing and building language and cultural development
Opportunities to keep learning	Building of their stories	Building, maintaining and revitalising community facilities

Older People	**Younger People**	**Community**
		and public infrastructure
Get to learn about young people	Fun and enjoyment	Producing public art
Development of skills, particularly social and new technology skills	Gain respect for the achievements of older adults	Encouraging volunteerism
Have fun and involved in physical activities	Provision of practical skills	Act as the impetus for other community projects
Pass on traditions, language and culture	School attendance improvement	Provide volunteers for community services and encourage people to work with other community groups
Exposure to difference	Support in building career and jobs	Create community stories, public history and shared accounts of the past
Development of friendship with younger people	Exposure to difference	Take care of the environment and manage land care
Practical assistance with activities such as shopping and transport	Diversion from "trouble", particularly drugs, violence and anti-social behaviour (at least while they are involved in activities)	Divert crime and anti-social behaviour
Helping build strength during adversity (resilience)		Encourage community health
		Fun and delight

6. Structured Training and Lifelong Learning

6.1 Lifelong learning in Elder-Spaces

One quite descriptive definition for lifelong learning is the one mentioned in Wikipedia: It is the "lifelong, voluntary and self-motivated" pursuit of knowledge for either personal or professional reasons.[17]

Elder-Spaces aims in providing an additional tool to elder people for further training and learning. There are many ways to boost one's knowledge or skills, and in some respect, Elder-Spaces will provide opportunities for furthering lifelong learning. As mentioned in deliverable D1.2, people may improve their knowledge by:

- Games: Cognitive or educational games can be used to foster people's knowledge on certain areas in a fun and exciting way.
- Interest groups: Motivated individuals can use the "Groups" functionality in Elder-Spaces to create groups on subjects that interest them and either tutor themselves or others to benefit from their expertise or attract other professionals or tutors to join the group and provide new information and teach the participants new skills.

As a platform, Elder-Spaces provides a variety of functionalities and applications that support learning goals. Still, it is important to also provide for a more structured way of training and learning. Besides leaving matters to the good intentions and motivation of individuals, it is important to provide some sort of structured method for learning new subjects and sparking an interest for further learning to elder people.

For this reason, an application that facilitates structured learning, in an "educational style" can be of great benefit to Elder-Spaces participants. For such an application, there are two main components:

- the application itself, the "technical" structure that provides the necessary functionality to users, in order for them to find, participate and reference courses;
- the actual material, the courses themselves.

Perhaps the most important factor for determining the success of such an application is the quality and variety of the available courses. Elder-Spaces has to provide courses with material that is of interest to elder people, so that they have a reason to participate in the application. In order to achieve this and taking into consideration that Elder-Spaces is not an e-learning organization, it has to be able:

- to share material from other e-learning organizations (free, public courses, or through collaboration with organizations get additional courses),
- to attract tutors to create more material to the application, and
- to involve Elder-Spaces users in the process of creating new courses and sharing the expertise and knowledge they accumulated in their professional years.

To achieve such goals, it is useful for Elder-Spaces to utilize an open-source platform to build the lifelong learning application. Sharing a common technical structure makes it easier to share material from other organizations that have compatible technical infrastructure. Naturally, this is not enough by itself, moderators and the platform's administrators / consultants need to get involved and make the necessary agreements with other educational institutions in order to refresh and expand the provided courses over time.

With respect to the goal of involving Elder-Spaces users to take the role of the teacher and create new material, it is understandable something that will not attract a large number of users. This option focuses on people with computer skills and the will to participate and share knowledge. In contrast to taking courses, creating them is not such a simple task. Therefore, it is going to be difficult for novice users to understand the concepts and create new courses. Still, it can be a powerful motivator for determined elders to acquire the necessary computer skills and get involved. Once again in this platform, the interaction with professionals who care for the elderly or other users who are more knowledgeable with respect to computers can be a factor of off-line interaction and socializing.

We have selected Moodle as the open-source platform for building the learning application on Elder-Spaces. Moodle provides a stable and widely adopted framework to create and manage an e-learning application. It provides different modules for using it as a student, teacher or administrator, a feature necessary to involve Elder-Spaces users to participate in updating and adding to the content of the site. In addition, Moodle supports multi-language interfaces and courses in different languages, a feature necessary for the goals of Elder-Spaces.

Finally, as it is widely adopted and open-source, there are many organizations from which to share material and courses, as well as many teachers with experience in creating material in this platform who could participate in Elder-Spaces.

6.2 Specification of UI

One of the important considerations regarding UI is the need to keep it simple and elder-friendly, as described in deliverable D1.2. In fact, it is necessary to scale down the available functionality of a complete Moodle installation. We must not introduce a heavy-with-functionality and options interface, as it would be harder for elder people to understand all the functionality and confuse them as to what they really need to do in order to use the application.

The focus will be on the content, which is the important issue in any e-learning application and in keeping the interface simple and light, with the important functionality available and adjusted to the needs and requirements of the elderly.

Our main focus is on the student. This application emphasizes on providing the students with interesting courses that will keep them motivated, intrigued and provide them with new knowledge and skills.

The UI related to the teachers will follow a similar pattern, but one must take into account that in order to create courses, one must have a better understanding both on computers and on the design procedure of e-Learning courses. One of the benefits of such a platform is of course the ability to educate its users on the system itself. We can have courses on the system, teaching users how to operate it and how to create new courses.

6.2.1 Student's UI

In the draft screen representations that follow, we illustrate the main UI screens available to users with the respective functionality. Note that the content of the courses may vary depending on the tutor's choices as to present the material.

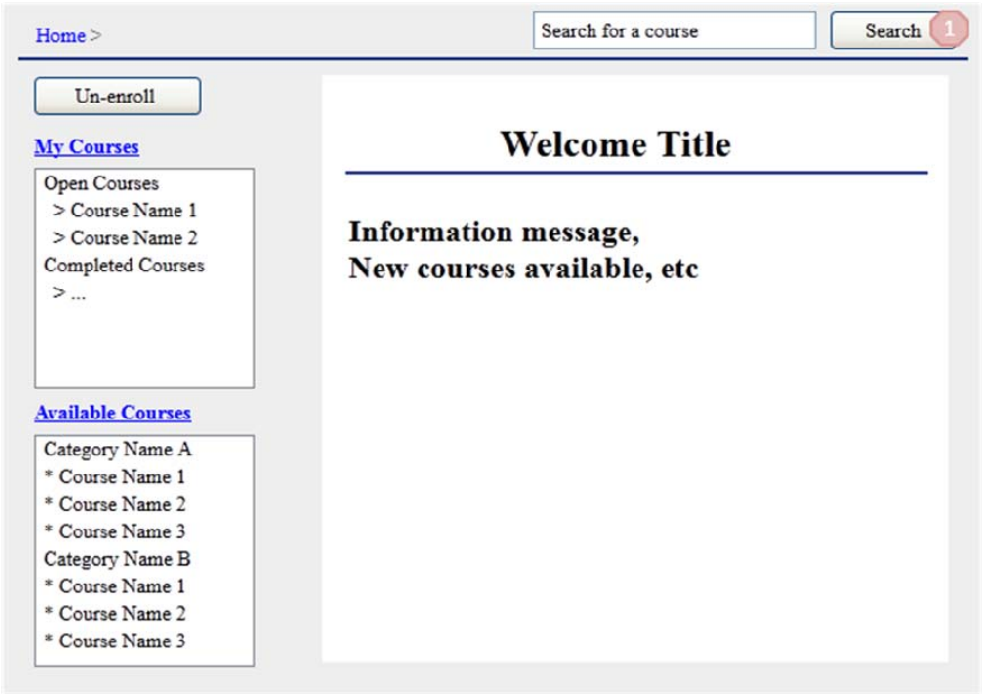

Figure 39: UI Storyboards for Lifelong Learning – Home

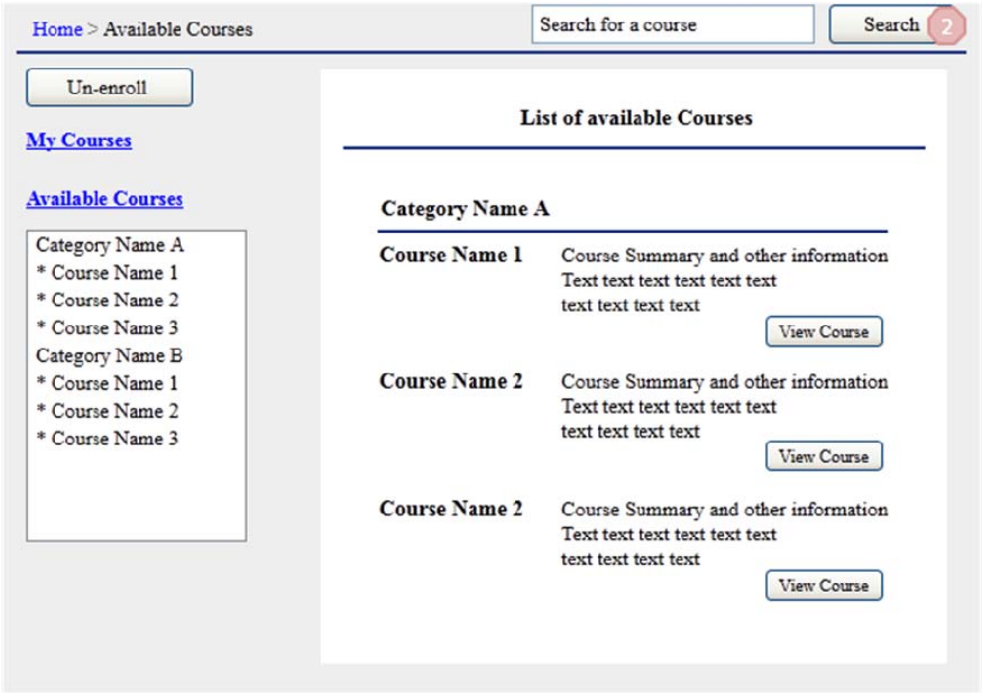

Figure 40: UI Storyboards for Lifelong Learning – Available courses

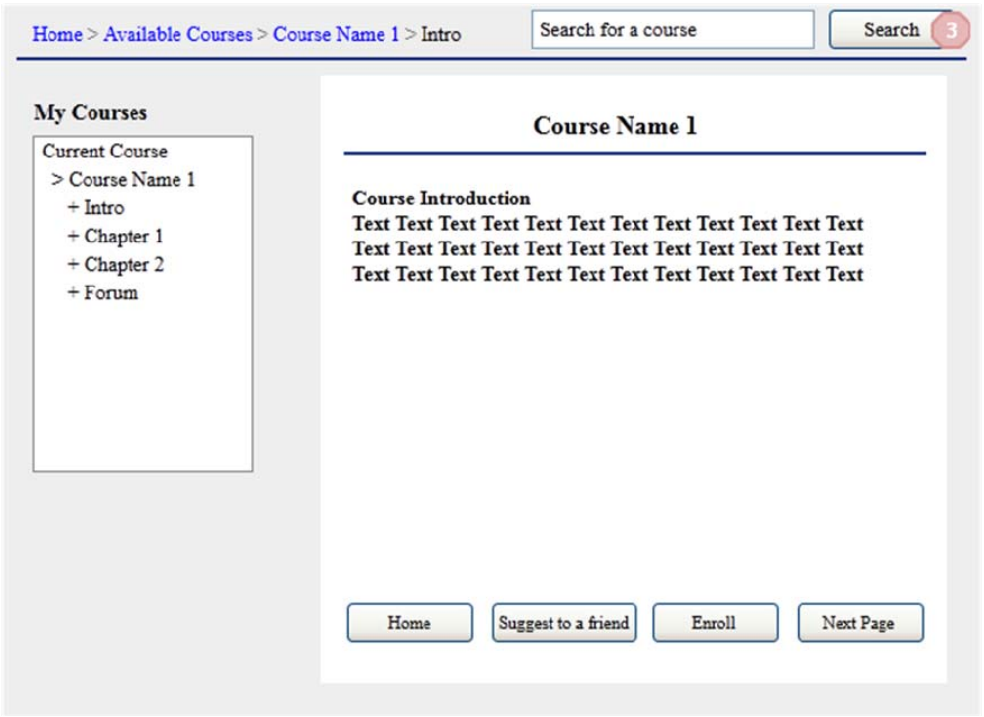

Figure 41: UI Storyboards for Lifelong Learning – Course content

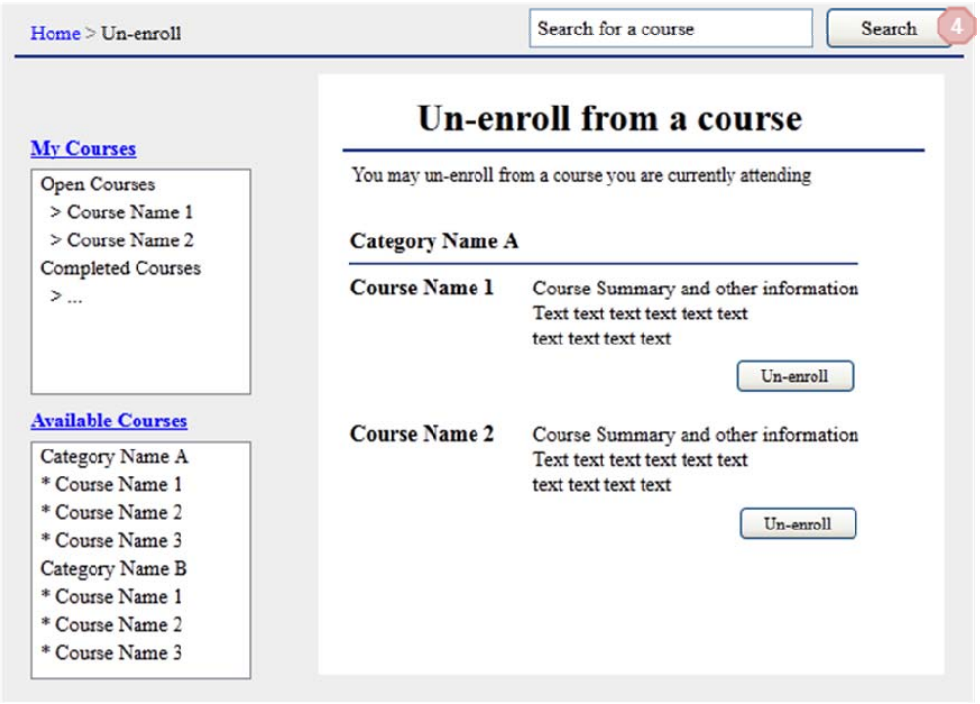

Figure 42: UI Storyboards for Lifelong Learning – Un-enroll

Screen breakdown and provided functionality

Table 11: UI description for Lifelong Learning (Student)

Screen	1 (Home)
Description	This is the main screen of the application, as seen by the student. It is divided into two main frames. The left frame holds all the links to available functionalities, while in the main frame is where courses and public messages are displayed Initially, the main frame displays welcome messages and shows any new information on courses or other issues that interest the users.
Components	Frames, hyperlinks, buttons, bread crumbs, tree component
Functionality	• My Courses: This is a tree structure with all of the user's enrolled courses. Courses are distinguished as open and completed (the completed courses are not expanded by default). • Available Courses: This is a tree structure with all the available courses of the application. • Un-Enroll: Pressing this button leads to screen 4, where users may un-enroll from a course. • Search: At any time, a user may search for a course, using key words. Enter text in the text box and press Search. Results are presented in screen 2.
Comments	Note that main navigation is performed by using the breadcrumb bar on top of the frame.

Screen	2 (Available Courses)
Description	This screen focuses user's attention to all available courses, in order for the user to find and select one that suits their interests. All courses are grouped by category.
Components	Frames, hyperlinks, buttons, bread crumbs, tree component
Functionality	• View Course: Pressing this button, the system moves to screen 3 and displays the first page of the selected course (all courses have an initial page with the course name, description and other information) • My Courses: This hyperlink opens the My courses tree. • Available Courses: This is a tree structure with all the available courses of the application. • Un-Enroll: Pressing this button leads to screen 4, where users may un-enroll from a course. • Search: At any time, a user may search for a course, using key words. Enter text in the text box and press Search. Results are presented in screen 2
Comments	Note that main navigation is performed by using the breadcrumb bar on top of the frame.

Screen	3 (Course Content)
Description	This screen displays the course material. On the left frame, the tree structure displays only navigation on the current course, while on the main frame, users see the course information and action buttons.
Components	Frames, hyperlinks, buttons, bread crumbs, tree component
Functionality	• Home: This button returns users to screen 1(Home) • Suggest to a friend: a message window opens to send a short message to a friend. A default message will invite the friend(s) to check the specific course, including the hyperlink to the course in the message. Users may wish to edit the message text before sending it. Recipients will be added by the users as described in the send message functionality of the platform. • Enroll: By pressing this button, users enroll to the course. It will appear in their list of open courses • Next Page: Navigates users to the next page of a course. Depending on the course, it might not be necessary to enroll in order to see the content.
Comments	Note that main navigation is performed by using the breadcrumb bar on top of the frame.

Screen	4 (Un-Enroll)
Description	The left frame displays the functionalities described in screen 1 (Home), while the main screen displays all courses that the user has enrolled, sorted by category.
Components	Frames, hyperlinks, buttons, bread crumbs, tree component
Functionality	• Un-enroll: By pressing this button users un-enroll from a course. The course is removed from the "My Courses" tree and any information on their progress on the course is also removed.
Comments	Note that main navigation is performed by using the breadcrumb bar on top of the frame.

6.2.2 Teacher's UI

In the following Figures, we present the main screens related to the teacher's role UI. In order to simplify UI, the teacher's functionality will be presented to the users as a different application, which they can choose to add to their profile. The two screenshots that follow, present the main screen for the teacher and the editing screen for creating courses.

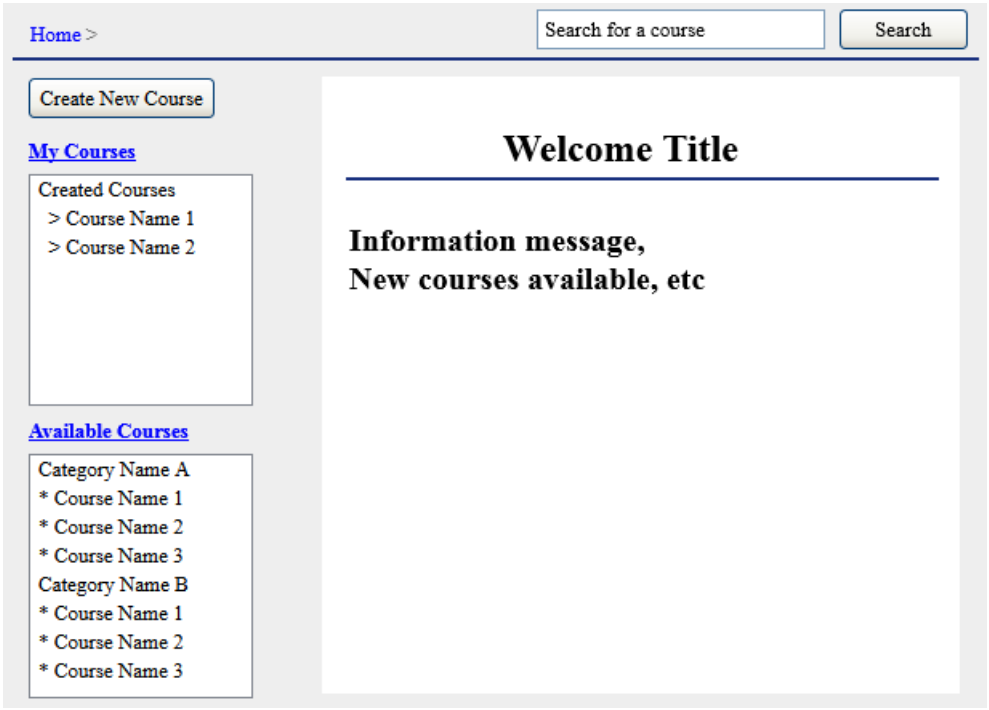

Figure 43: UI Storyboards for Lifelong Learning – Teacher's screen

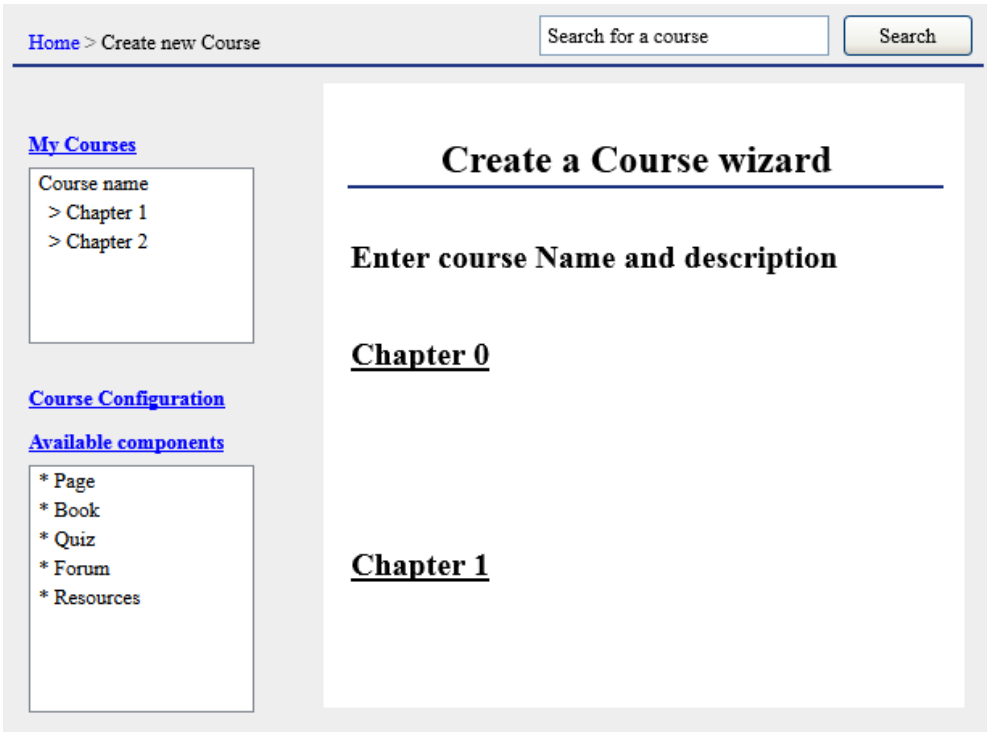

Figure 44: UI Storyboards for Lifelong Learning – Teacher Create Course

Table 12: UI description for Lifelong Learning (Teacher)

Screen	1 (Home – Teacher's screens)
Description	The main screen for teachers is divided into three sections. The top frame holds navigation and searching. The left frame is used for main functionality options. Users can choose either from the list of their created courses or they can check the other available courses. They may start a new lesson from the "Create New Course" button. In the main frame, they see introduction messages and news.
Components	Frames, hyperlinks, buttons, bread crumbs, tree component
Functionality	• Create new course. By pressing this button, they can start a new course; they are redirected to the new course screen where they can start editing their course. • My courses. This is a list of the courses they have created. They may open one and edit it. Courses that have started and have students participating may only be extended, new courses may be added in the same UI as they create new course screen. • Available courses. Teachers may wish to browse other courses and see what else is available. They can do this by browsing in the "Available Courses" tree component. They are able to see only the first page of the courses. For participation, they need to enter student mode. • Searching is also available, in the same way it works for the student UI.
Comments	Note that main navigation is performed by using the bread crumb bar on top of the frame.

Screen	2 (Create new course – Teacher's screens)
Description	This is the screen were teachers may create or edit their courses. Screen layout is the same as in the Home screen. The UI is divided into three sections. The top frame holds navigation and searching. The left frame is used for main functionality options. Here, a teacher sees all the available tools for creating a course. From simple text pages, to course forums and quizzes. In the main frame, a wizard is available for creating courses.
Components	Frames, hyperlinks, buttons, bread crumbs, tree component
Functionality	• Course Configuration. This link opens the course configuration menu. There teachers may provide main information about the course, like title, description etc. They also: - Select the type of course – per topic or per week - Select if and when the course is available to students - Decide on issues regarding layout and presentation - Deactivate/Delete a course • Page. Adds a page to the course. This is a simple html page containing course material

	• Book. It represents a collection of pages linked to each other containing material in a book resembling way. • Quiz. The teacher may add a quiz to the course, using multiple choice questions. • Forum. It is possible to add a forum for student/teacher interaction. A forum may be added in the whole course or in a particular chapter • Resources. This option, adds external material to the course. Like power point presentations, pdf files and other.
Comments	Note that main navigation is performed by using the bread crumb bar on top of the frame.

Courses in Elder-Spaces, are not intended to provide certifications or any type of "curriculum" education. As Elder-Spaces is not an educational organization, we do not emphasize on courses that require much teacher supervision. Courses need to be self-paced and should they include excursuses or quizzes, they need to be structured in a manner that little or no teacher intervention is required.

Note that additional functionalities may be available for both the student and the teacher, depending on the course material and its author's choices on presenting it. These functionalities are described in the technical aspects section. For complete reference, please check the Moodle online documentation[18].

6.3 Technical aspects

6.3.1 Login

Structured training is available only to authenticated users. Courses may be short, requiring a few hours to complete, or they might be long ones, taking several hours or even days to finish. The system needs to keep track of the users' progress and status, in order for them to be able to continue courses from the point they stopped during their last session.

Specific user login is not required in the application. Although Moodle requires login of students, the application will propagate information from the Elder-Spaces profile to use as user details and respectively, it will support seamless login of users through their Elder-Spaces authentication.

Initialization of profile details occurs when users add this application to their profile. By adding the application, they authorize it to use their profile information to create the necessary profile in the learning application.

6.3.2 Personalization – profiling

The following table displays the list of functionalities available to users, depending on whether they have enrolled in a course or not. The "□" symbol indicates conditional yes, as this

functionality is available to users on the discretion of the teacher who created the course.

Table 13: Structured learning functionalities per role

Functionality	Authenticated User	Enrolled Student	Teacher
View Available courses	■	■	■
View My Courses		■	
Search courses	■	■	■
View course content	□	■	□
Continue Course		■	
Enroll in a course	■		
Un-enroll from a course		■	
Suggest course to a friend	■	■	
Next page	□	■	
Home	■	■	■
Create new course			■
Edit course			■
Course configuration			■
Course optional functionality			
Quiz	□	■	■
File	□	■	■
URL	□	■	■
Forum	□	■	■
			■
			■
			■

The "Course optional functionality" lists a number of optional components/functions that users may see in a course. Note that only the most common functionalities are presented, those intended to be present in the selected courses that will initialize the application. We present a short description of each of them below.

Selected course components:

- Quiz: Multiple choice or text questions for the student to answer
- File: Files are external files used to assist in the course as additional material. They can be of any format, although usually they include word docs, pdf or audio/video files
- URL: External links to URLs with additional or relevant information to the course material may be added in the course.
- Forum: A Forum can be used by teachers in a course (or per chapter) to stimulate conversation and exchange of ideas between students.

6.3.3 Notifications – messaging

The lifelong learning application does not interact by sending notifications to the users. The only interaction that is possible has to do with users suggesting a course to their friends, by invoking the send message core functionality of the Elder-Spaces platform.

6.3.4 Workflow

In Figure 45 the detailed workflow with the user's options on navigating the UI is displayed.

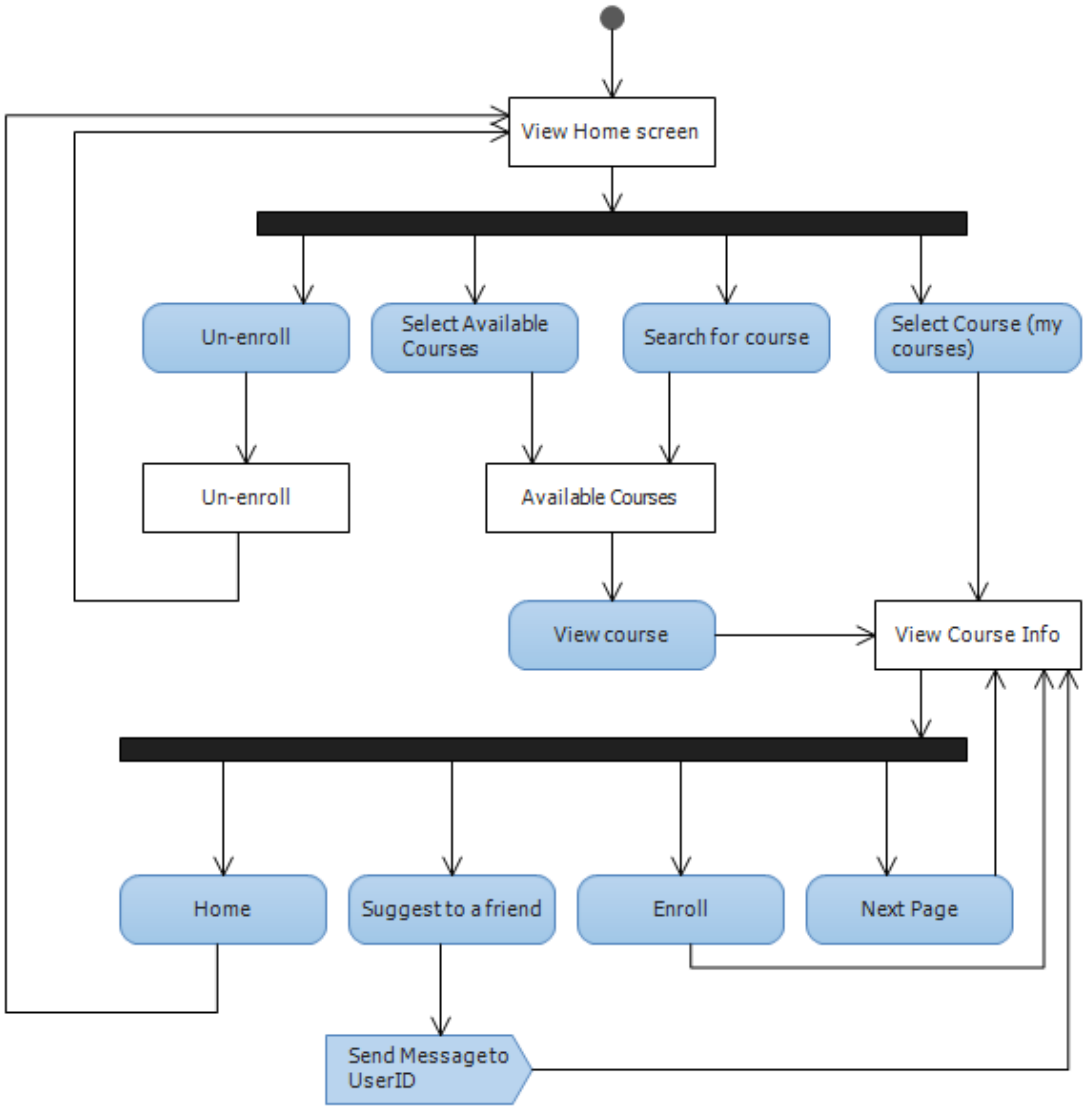

Figure 45: Workflow on Lifelong Learning Student UI

6.4 Expected social impact

As people grow older, their learning goals and selections change. There is a shift from learning skills to improve a person's curriculum or other employment related training to more intrinsic and social criteria. There is still an increasing demand for work related qualifications, in the ages over 55 and close to retirement, that reflects the growing number of people working. There is a large percentage of people in this age group that needs to update skills or learn new ones to hold on to job position or even find a new one.

In general, participation in qualification bearing courses falls with age. Elder people are more interested in participating in courses that interest them, or follow subjects clearly out of enjoyment for the learning process and the subject matter[19].

Table 14: Older learners' motivation to learn

	45-54	55-64	65-74
Rising importance with age			
Interest on the subject	31	42	51
Enjoy learning	20	30	53
Improve self-confidence	12	13	14
Meet people	6	8	16
Falling importance with age			
Help in current job	39	25	8
Develop myself as a person	29	28	20
Get a recognized qualification	21	9	5
Make my work more satisfying	17	13	6

The subjects more often chosen by elder people to study also change. The four most common subjects are:

Information and communication technologies. Computer skills account for 40% of people involved in learning over the age of 55. Motivations include the need to keep up with younger generations and developing the skills necessary to socialize using technology (keeping in touch with remote relatives or get to know new people through social networks).

Foreign languages. Most often a choice of higher social classes, it is associated with greater leisure in retirement and the prospect of holidays or living abroad.

Health. There is a greater interest closer to the age of 50 and declining after that. Health related courses might interest people who train and work in a related area, along with others who are interested in staying healthy.

Cultural subjects. This category gains favour as people age. Cultural subjects are associated with personal development and meaning. Women show particular interest in category of courses. Over 75% of people choosing such courses are females.

Elder-Spaces lifelong learning application aims in contributing in these efforts of learning and improvement. Participating in the social network itself is a motivator to learn more about

information technology and develop skills that are necessary to use and socialize through Elder-Spaces or other social networks.

Courses in technology, lessons providing specific information and training on using Elder-Spaces can benefit the target audience. Such courses can be of high demand and also make it easier to users not familiar with technology to use the social network's functionalities. This way it can be easier for elder people to utilize the available resources and have a fuller experience from the social network, achieving its goals to improve socializing between elder people, boosting self-confidence and getting them involved in more online and off line activities.

Other courses, like foreign languages, health or cultural subjects can provide useful information and knowledge to elder people, helping them stay healthy, or providing more incentives to travel and meet new people with common interests.

For people who are working and are close to retirement, it is possible to provide the necessary skills to adjust to new challenges to the later stages of employed life, or even plan and prepare for the transition to retirement.

For retired people, the application can provide learning opportunities to acquire constructive skill, or find new identities, enrich their interests and keep them active in their retirement years. Maintaining their health through teaching how to protect oneself is also an important result from continuous learning.

Learning can also be a common interest by itself. Elder people in the social network have the ability to interact with their "fellow students". This type of socializing, is novel to them but can provide stimulus for further engagement to learning subjects and also provide new acquaintances. Taking into account that in the context of Elder-Spaces there are many synergies between the provided functionalities and applications, making new acquaintances is not something purely virtual. Taking advantage of other applications that promote off line activities can lead to furthering socialization in real world.

7. Conclusions

D2.2 describes the results of the second constructive step in the multi-step development process of the Elder-Spaces project:

It specifies the **basic functionality** of the Elder-Spaces social network platform:

- Authentication
  - Registration – Login – Password retrieval
- Profile management
- Friend management
  - Add friend – Remove friend
- Group management
  - Create a group – Edit a group – Delete a group – Membership control
- Event management
  - Create an event – Edit an event – Delete an event
- Media and album management
  - Upload – Create an album – Browse albums
- Messaging
  - Wall – Message management – Send and respond to invitations – Comments
- Simple search

It specifies the **user-interfaces and user-interaction**, respectively, for the selected **applications** of Elder-Spaces:

- games,
- events,
- intergenerational activities,
- Travel Memories,
- training & learning.

It describes the potential **social impact** of the applications for later consideration in the user trials and evaluation.

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