





D1.2.1 Use Case Specifications Patient Journey

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Project PLAYTIME

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1 Scenario first field Study

Mw. J. is 74 years old and lives with her husband in an apartment. Mw J. owned a grocery store for many years. Three years ago, Mw J. has been diagnosed with Alzheimer. Mw J. has difficulties with daily activities. Her husband is a golfer and a few days per week on the course. During these days, mw. J. is most of her time inactive. Mw. J. and Mr. J. have two children who live at the other side of the country. They come home on weekends and holidays.

Mw J. has a case manager who visits her once every two months. Her case manager has told mw J. and Mr. J. try to increase her daily activities with PLAYTIME. Mw J. is very interested in the PLAYTIME project. A professionally trained healthcare professional sends the information letter and an informed consent form.. After two weeks she has called mw. J. to inform if they are interested in the project, and there is an appointment made for the first house visit.

During the house visit, the healthcare professional talks with the couple about their day-to-day activities. They discuss mw. J's disease and her diagnose. The MMSE will be performed. Mw J has a. 24/30 score. The MoveTest will also be performed she scores 10 out of 12 points. The MoveMonitor and the Amicasa tablet will be provided and explained. Mw J is not yet part of a group for people with dementia, but she is open to join a group to test and play PLAYTIME.

Mw J. will be included in the first field test. She will join the group sessions for two weeks, and will play PLAYTIME at home for the same period of time. During the first testing week, Mw J. will wear the MoveMonitor for 24 hours per day. Mr. J. will play the SERES Dementia™ game, with mw J. and separate one time each week.

At the end of the two-week testing period, the healthcare professional will visit mw. J and Mr. J. again. During this house visit, she will evaluate the experiences of mw J. and Mr. J with PLAYTIME by using a semi-structured topic list. The tablet and MoveMonitor will be collected.

2 Requirements

2.1 Patient requirements

A person with dementia will be included to participate in the first field study when (s)he:

- Is diagnosed with dementia as formulated in DSM-IV or DSM-V: extended neurocognitive disorders caused by Alzheimer, Lewy bodies, vascular diseases or multiple origins. Frontotemporal lobar degeneration is excluded for this trail.
- Is in an early stage of dementia. MMSE of at least 22/30.
- Still lives at home in the region of Eindhoven.
- Has an informal caregiver.
- Speaks Dutch.
- Has no severe visual and auditory processing disorders.
- Has sufficient physical abilities (according to MoveTest of McRoberts) minimal 1 Point every part of the test
- Is willing to participate in and travel to group gatherings.

2.2 Group requirements

- Interactive mat with 5 cones
- Tablet PC
- Every week the same healthcare professional
- Weekly the same time and place
- Every meeting lasts 1 hour and 30 minutes with a 15min break.
- Large table with sturdy chairs (for balance during movement exercises)
- Toilet available

3 Patient journey

3.1 Pre-trial

3.1.1 Patiënts

- When people with dementia and their informal caregiver are interested in PLAYTIME, some information about the project will be provided to them. They will receive the following document by mail (or post):
 - Informed consent
 - Information letter
- After 2 or 3 weeks, the healthcare professional will call to check if there is still any interest in participating in the PLAYTIME project. When people living with dementia are interested, an appointment will be made to visit them at home.
- During the house call, the healthcare professional will assess if the person with dementia meets the patient requirements of PLAYTIME. The informed consent and information letter will be checked and discussed. The MoveTest will be performed as well as de MMSE. There will be a questionnaire about their abilities and day to day activities. The MoveMonitor will be explained and provided.
- We will demonstrate the PLAYTIME product to the participant and their informal caregiver, and we will discuss when and where the group sessions will take place
- We will make an appointment for the second home visit
- People living with dementia will be offered the possibility to keep track of their PLAYTIME activities by a logbook. This logbook is an additional service (not an obligation) and offered to assist them in writing down their PLAYTIME activities, questions and remarks for evaluation.

3.1.2 Group

- The healthcare professional will call if a group is interested in the PLAYTIME project and would like to be further informed.
- The healthcare professional will send flyers to the group.
- The healthcare professional will make an appointment with the professional caregiver from the group. During this appointment, it will be discussed if the patient requirements and group requirements can be met. The formal caregiver will receive a mail address and phone number of the healthcare professional to ask question and let know when people with dementia are interested in participating in PLAYTIME.

3.2 Schedule first field study

Week	Location	Guidelines
1	Group Home	First group session MoveMonitor Eye-tracking calibration exercise Practice at home with caregiver the SERES Dementia™ game Practice at home with Amicasa Caregiver plays the SERES Dementia™ game
2	Group Home	Second group session Practice at home with caregiver the SERES Dementia™ game Practice at home with Amicasa Caregiver plays the SERES Dementia™ game

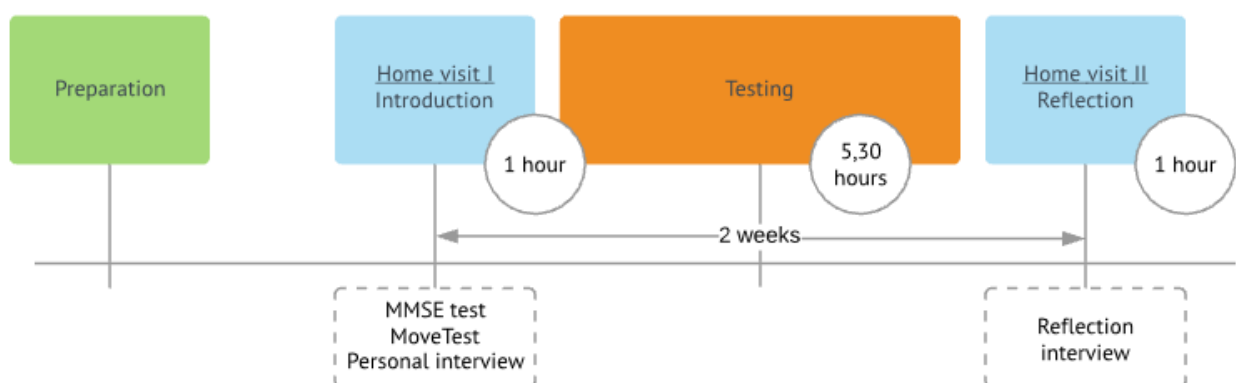


Figure 1: Summary of study procedure.

3.3 Evaluation

3.3.1 Patient evaluation

After the testing period there will be a second home visit to evaluate PLAYTIME. During this home visit we will;

- Evaluate the PLAYTIME product with a questionnaire, asking questions about the use and experience of the PLAYTIME product. The interview will be recorded.
- The informal caregiver will be asked about the SERES Dementia™ game.
- We will collect the move monitor and the tablet
- We will ask if they would like to participate for the main field study
- We offer the possibility to join in the focus groups

3.3.2 Group evaluation

- Evaluate the PLAYTIME mat and cones.
- Evaluate the questions and exercises in the different PLAYTIME modules.
- Evaluate the group process and requirements.
- Collect the PLAYTIME mat, cones and tablet.

4 The end of the PLAYTIME project

4.1 Example scenario

Mw. J. is 76 years old. She lives with her husband in an apartment. Mw J. owned a grocery store for many years. Five years ago, Mw J. has been diagnosed with Alzheimer. Her husband has a few hobby's and left the apartment a few hours per week. During these hours, Mw J. has difficulties with filling in her daily activities. When mw J.'s husband is at home, she goes out for a walk, enjoys cooking and play cards. Mw J. and dh. J have a two children who are living at the other side of the country. Their children come home on weekends and holidays.

Mw J. has started playing PLAYTIME in the Field Study. She has started joining a group where PLAYTIME is played every week. Mw J. was enjoying the group sessions so much, that she is now going three times a week. The group plays PLAYTIME every week, with the same people. It has really became a group. Mw J. finds the physical exercises very nice. The players in her group perform the movement exercises all The group questions about the social situations lead to an interesting conversation at the coffee table. She enjoys when the group is helping each other with the questions. The players of her group, find it is very nice that they can pick a topic where they are interested in. Every week, someone else gets to choose a topic or there is a topic that will fit the time of year. This brings extra spirit to events like Christmas and leads to a conversation about the activities they are going to do.

Mw J. practices at least two times a week at home with Amicasa. Her husband suggests it when he leaves the house. Mw plays it at least 20 minutes. she enjoys the puzzles very much. They are not too easy nor too difficult and stimulate her to play other games. She notices nothing about the eye-tracking calibration procedure. Sometime she plays with her husband, then they also play the social realistic scenarios. These scenarios lead to conversations about with and has learned Mr. J. different options in coping with multiple situations.

With the MoveMonitor it was noticed that mw doesn't move as much in the weekends, then often the children will visit and they stay for dinner. Mw is mostly sitting on these days because her children take care of everything. The family has been made aware of this fact by the rapport of the MoveMonitor. Now, the family will motivate mw J. to get active: sometimes they go for a walk, they cook together, or do some other activities. The next report will show that mw J.'s activities has been increased in the weekends.

Overall mw J. is more active. There are more activities during the week that stimulates mw J. Because of this, she enjoys her week more and her mood is improved. Mw J. sleeps better because she is more active during the day. Mr. J. is more comfortable to leave the house for his activities and he also sleeps better. Therefore, the quality of live for mw J. and Mr. J. has been improved. They both have more exercise during the week. Mw. J and Mr. J want to continue playing PLAYTIME and recommend it also to other people with dementia.

4.2 General Use Case Amicasa (FAM)

Field	Description
Use case name	Multimodal playful training for people with dementia in a group setting.
Goal	To goal of this use case is to play Amicasa in a group setting. Amicasa is a personalized emotion-orientated multimodel serious game that stimulates cognitive processes, addresses physical activities and fosters social inclusion of people with dementia.
Summary	A formal caregiver downloads the Amicasa application on a Tablet or Tablet PC. Subsequently, a user name and password are created. When logged in, the formal selects the desired trainings modules or generates own content. Finally, the formal caregiver lays out the board mat game, unpacks and sets up the cones, and finally starts the game.
Actor(s)	People with dementia, informal care givers (e.g. family member, friend or neighbor), formal caregiver, experts.
Relations	Other use cases of Amicasa are: single clients and home settings. General use case SERES Dementia™. General use case MoveTest and MoveMonitor.
Precondition(s)	<ol style="list-style-type: none"> 1. Caregivers burden and disease state of person with dementia. There needs to be an assessment for who is suited to play the game. 2. A formal caregiver have to be trained in operating and creating the different methods (i.e. knowledge-based questions, movement exercises) of Amicasa. Next to this, training ensures that the formal care giver is able to lead the game adequately. 3. A formal caregiver need to download the Amicasa application on a Tablet or Tablet PC. Subsequently, a user name and password need to be created. Both steps require internet access. During the course of the game, internet access due to poor connectivity of certain geographical areas must not be required anymore. 4. The number of teams/persons allowed to play the Amicasa board game is up to five. 5. Both the Tablet or Tablet PC and the cones (if needed) need to be sufficiently charged.
Trigger(s)	<ol style="list-style-type: none"> 1. People with dementia can decide if they want to play Amicasa in a group setting. 2. Formal caregiver can introduce Amicasa in a group setting.
Basic flow	<ol style="list-style-type: none"> 1. The formal care giver logs in on a sufficiently charged Tablet or Tablet PC. 2. When logged in, the formal caregiver performs the following actions: The desired group training is selected. <ol style="list-style-type: none"> a) The desired group training is selected. b) Existing and available training modules are selected or new training modules are created by building a string of desired methods (by the formal caregiver), or by generating own content based on desired methods. 3. The formal caregiver lays out the board game mat, unpacks and sets up

	the cones and finally starts the game.
Alternative flow	In case the persons with dementia want to play and practice the modules of PLAYTIME more frequently, they can play the individual player set-up at home or the multi-player set-up together with his/her informal care giver(s).
Exception flow	<ol style="list-style-type: none">1. When there is no access to internet, it will not be possible to download the Amicasa app.2. If the user enters a wrong username and/or password in Amicasa, no access will be provided.

4.3 General Use Case SERES Dementia™ (MBY)

Field	Description
Use case name	Dementia game for caregivers/people with dementia in group setting.
Goal	Using serious gaming as a tool to improve successful decision-making while coping with dementia (patients) or coping with the burden of caring for people with dementia (caregivers). Improve the feeling caregivers and people with dementia have about the situation by using an educational intervention that targets their unmet needs. Improving their understanding of (possible) problems which in return can lead to more positive outcomes and better caregiver-person with dementia interactions/relationships.
Summary	A moderator explains the goal and functionality of the serious games. When the moderator has set up PLAYTIME successfully, and the Dementia game starts, the caregiver or person with dementia can input some basic information before the module(s) begin to be played. During the educational intervention, the moderator evaluates the proper use of the game and can provide some additional feedback if the players have any questions. Input from the user (answers) is processed, analysed and scored. Based on the inputs the game generates an output (feedback and/or score).
Actor(s)	People with dementia, (family) caregiver, family members, peers. The different real-life actors are in the game represented by prototypical characters. A variety of possible actor dynamics are considered.
Relations	Other Use Cases of the serious game are caregivers/people with dementia in home setting. General Use Case MoveMonitor and MoveTest (MCR). General Use Case Amicasa (FAM).
Precondition(s)	<ol style="list-style-type: none"> 1. Caregivers burden and disease state of person with dementia. There needs to be an assessment for who is suited to play the game. 2. Users need to have access to the PLAYTIME application and the serious game. This needs to be provided by the moderator when played in group. 3. During the use of the game people with dementia need to be able to receive support from a moderator and/or caregiver to help them complete the steps. 4. People with dementia/caregivers should be able to use the game on different occasions in order to train and see progress. 5. The moderator and/or caregivers need to receive some training so that they are fully prepared to guide and help the persons with dementia.
Trigger(s)	<ol style="list-style-type: none"> 1. People with dementia can decide if they want to participate in playing the 'Patients with Dementia' serious game. 2. Caregivers can decide if they want to participate in playing the 'Dementia Caregiver' game. 3. When the group is gathered to play, the moderator introduces the game to the players.
Basic flow	Group play with fellow caregivers (and/or multiple persons with dementia) where

	<p>they can use the different scenarios to discuss common problems and ways to them.</p> <p>Develop insight in functional versus dysfunctional coping, and the impact of their decisions on outcomes for loved ones and their environment.</p> <p>Scenarios are presented in a linear sequence. In each scenario the end user can select an answer which will generate a feedback response and scoring result. At the end of the game the player sees a result screen with his/her final score and additional feedback</p>
Alternative flow	Use of the serious game in a home setting. Similar game set-up.
Exception flow	When the user does not fill in the requested information at the start-up screen, the game will not start.

4.4 General Use Case MoveTest (MCR)

Field	Description
Use case name	MoveTest measurement in PLAYTIME.
Goal	To perform a measurement with a MoveMonitor by a healthcare professional using the PLAYTIME solution.
Summary	A healthcare professional programs a MoveTest via the PLAYTIME app on a Windows-based tablet or laptop. A protocol is selected that contains all the measurements that need to be performed (balance test, gait test, repeated sit-to-stand test). The measurement is allocated to a project, an anonymous subject code and visit. A programmed system is given to a subject and a measurement is performed by the healthcare professional at that moment. When the measurement is finished, the healthcare professional processes the measurement using the PLAYTIME app. Measurements are processed on McRoberts' analysis servers, and results are stored in a central PLAYTIME database. The healthcare professional, informal caregiver and person with dementia can view the results in the PLAYTIME app.
Actor(s)	Healthcare professional, subject (person with dementia), informal caregiver.
Relations	General Use Case MoveMonitor (MCR). General Use Case Amicasa (FAM). General Use Case SERES Dementia™.
Precondition(s)	<ol style="list-style-type: none"> 1. Healthcare professional has to be trained in using the MoveTest. 2. Drivers and software (DynaPort manager) for the MoveTest and the PLAYTIME app are installed on the healthcare professional's tablet/laptop (windows). 3. The PLAYTIME app has to be installed on the tablet of the subject (with dementia) and informal caregiver. 4. All users of the PLAYTIME app have to be given instructions on how to use the app.
Trigger(s)	Based on the protocol of PLAYTIME, a measurement with a MoveTest is performed in the first week and in the last week of the group sessions.
Basic flow	<ol style="list-style-type: none"> 1. A subject is enrolled in the study and based on the protocol, a measurement with the MoveTest has to be performed in the first and last week of the group sessions (Trigger). 2. The healthcare professional couples a fully charged MoveTest device to his/her windows based tablet or laptop via a USB cable and logs in on the PLAYTIME app with his/her personal login credentials 3. When logged in, the healthcare professional programs a fully charged device. Based on the PLAYTIME protocol, the following input is entered: <ol style="list-style-type: none"> a) The measurement is allocated to a predetermined project b) An anonymous subject code with a predetermined format is allocated to the measurement. c) A predetermined visit code is allocated to the measurement. 4. A predetermined measurement protocol is selected. 5. After successful programming, the device is handed over to the subject

	<p>and a measurement is performed guided by the PLAYTIME app</p> <ol style="list-style-type: none"> 6. The subject returns the device to the healthcare professional when the measurement is finished. 7. The healthcare professional couples the device to his/her windows tablet/PC and logs in on PLAYTIME app. This triggers automatic download (to the windows tablet/PC of the healthcare professional), upload (to McRoberts' analysis server) and analysis of the data on McRoberts' cloud server. 8. Outcomes of the analysis are stored in a database on McRoberts' server and in the central PLAYTIME database and a graphical report can be viewed by the healthcare professional, subject and his/her informal caregiver on their individual PLAYTIME apps (with personal login credentials). 9. The healthcare professional can discuss the outcomes of the MoveTest measurements with the subject and his/her informal caregiver.
Alternative flow	In case automatic uploading fails, a manual upload function can be added to the PLAYTIME app, which can only be accessed by the healthcare professional.
Exception flow	When the healthcare professional enters a wrong username and/or password on the PLAYTIME app, no measurement can be programmed.
Potential risks	<ol style="list-style-type: none"> 1. Battery is empty before the end of the measurement. 2. Download or Upload process is interrupted (e.g. device unplugged, tablet/laptop shut down). 3. Errors are made by the healthcare professional while programming the device.
Risk mitigation	<ol style="list-style-type: none"> 4. Only devices which are > 50% charged can be programmed 5. Download or Upload should resume after device is reconnected or tablet/laptop is restarted. 6. Input (e.g. project, visit name) can be limited to a specific range or choice, or is fixed. These settings are stored in the user profile the PLAYTIME app and cannot be changed by the user.

4.5 General Use Case MoveMonitor (MCR)

Field	Description
Use case name	MoveMonitor measurement in PLAYTIME.
Goal	To perform a measurement with a MoveMonitor by a healthcare professional using the PLAYTIME solution.
Summary	A healthcare professional programs a MoveMonitor via de PLAYTIME app on a Windows-based tablet or laptop to measure for 7 days at predetermined time points in the project. The measurement is allocated to a project, an anonymous subject code and visit. A programmed system is given to a subject who wears the monitor for a week (24/7). When the measurement is finished, the subject returns the monitor to the healthcare professional who processes the measurement using the PLAYTIME app. Measurements are processed on McRoberts' analysis servers, and results are stored in a central PLAYTIME database. The healthcare professional, informal caregiver and patient can view the results in the PLAYTIME app.
Actor(s)	Healthcare professional, subject (person with dementia), informal caregiver.
Relations	General Use Case MoveTest (MCR). General Use Case Amicasa (FAM). General Use Case SERES Dementia™.
Precondition(s)	<ol style="list-style-type: none"> 1. Healthcare professional has to be trained in using the MoveMonitor. 2. Drivers and software (DynaPort manager) for the MoveMonitor and the PLAYTIME app are installed on the healthcare professional's tablet/laptop (windows). 3. The PLAYTIME app has to be installed on the tablet of the subject (with dementia) and informal caregiver. 4. All users of the PLAYTIME app have to be given instructions on how to use the app.
Trigger(s)	Based on the protocol of PLAYTIME, a measurement with a MoveMonitor is performed in the first week and in the last week of the group sessions.
Basic flow	<ol style="list-style-type: none"> 1. A subject is enrolled in the study and based on the protocol, a measurement with the MoveMonitor has to be performed in the first and last week of the group sessions (Trigger). 2. The healthcare professional couples a fully charged MoveMonitor device to his/her windows based tablet or laptop via a USB cable and logs in on the PLAYTIME app with his/her personal login credentials 3. When logged in, the healthcare professional programs a fully charged device. Based on the PLAYTIME protocol, the following input is entered: <ol style="list-style-type: none"> a) The measurement is allocated to a predetermined project b) An anonymous subject code with a predetermined format is allocated to the measurement. c) A predetermined visit code is allocated to the measurement. d) The start date of the measurement is the day of the visit e) The start time of the measurement will be the start time of the group session (so the end time will automatically be the start of the group session the week after).

	<ol style="list-style-type: none"> 4. After successful programming, the device is handed over to the subject and instructions are given on how and when (and when not!) to wear the device. 5. The subject returns the device to the healthcare professional during the next group session. 6. The healthcare professional couples the device to his/her windows tablet/PC and logs in on PLAYTIME app. This triggers automatic download (to the windows tablet/PC of the healthcare professional), upload (to McRoberts' analysis server) and analysis of the data on McRoberts' cloud server. 7. Outcomes of the analysis are stored in a database on McRoberts' server and in the central PLAYTIME database and a graphical report can be viewed by the healthcare professional, subject and his/her informal caregiver on their individual PLAYTIME apps (with personal login credentials). 8. The healthcare professional can discuss the outcomes of the MoveMonitor measurements with the subject and his/her informal caregiver.
Alternative flow	In case automatic uploading fails, a manual upload function can be added to the PLAYTIME app, which can only be accessed by the healthcare professional.
Exception flow	<ol style="list-style-type: none"> 1. When the healthcare professional enters a wrong username and/or password on the PLAYTIME app, no measurement can be programmed. 2. When the subject does not remove the MoveMonitor device during aquatic activities (e.g. showering, swimming), it will fail as it is not water proof.
Potential risks	<ol style="list-style-type: none"> 1. Battery is empty before the end of the measurement. 2. Patient tampers with the device (e.g. connects device with USB cable to PC) 3. Device is not returned to the healthcare professional. 4. Download or Upload process is interrupted (e.g. device unplugged, tablet/laptop shut down). 5. Errors are made by the healthcare professional while programming the device
Risk mitigation	<ol style="list-style-type: none"> 1. Only devices which are > 30% charged can be programmed 2. Device will continue measuring after the device is unplugged 3. The healthcare professional should have an overview of the status of each measurement so he/she can act when a measurement has finished, but the device is not returned. 4. Download or Upload should resume after device is reconnected or tablet/laptop is restarted. 5. Input (e.g. start time, project, visit name) can be limited to a specific range or choice, or is fixed. These settings are stored in the user profile the PLAYTIME app and cannot be changed by the user