D3.5 Value Version

DAPAS - Deploying AAL Packages at Scale

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Abstract:

After the rollout of the Starter Version the DAPAS System will now be extended in a second step by additional hardware components for the participants. Hence, the Value Version includes an Emma base station with an emergency function and voice control, a motion detector and an intelligent lamp. The Starter and Value Version are a connected system, and are to be understood as a system based on each other. The goal is to provide the participants with existing AAL solutions that communicate and interact with each other and thus create added value. The focus is on a plug & play friendly solution and hence is surveyed within the scope of the installation. In addition, the Starter Version was continuously improved (updates) and new functions were added to the DAPAS App.

0.1. Versions and Changes

Version	*Date*	*Changes*	*Name*	*Organisation*
0.1	21.01.2020	Generation of the document	Tanja Kospach	EXT
0.2	14.10.2020	Initial Content	Julia Aldrian, Aritz Badiola	EXT, DEU
0.3	20.10.2020	Wellbeing Content	Lukas Rödl	AIT
0.4	21.10.2020	Content about KWIDO APP changes and updates	Iñaki Bartolomé	IDE
0.5	21.10.2020	Content about Serious Games	Aritz Badiola	DEU
0.6	22.10.2020	Feedback and Conclusion	Aritz Badiola	DEU
0.7	22.10.2020	Review and content adding	Natália Machad, Aritz Badiola	CDC,DEU
1.0	23.10.2020	Release	Aritz Badiola	DEU

0.2. List of Authors

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0.3. Abbreviations

Abbreviation	*Descriptions*
AAL	Active and Assisted Living
UI	User Interface

CONTENT

FIGURES and TABLES

1. ABOUT THIS DOCUMENT

1.1. Role of the deliverable

This deliverable aims to present the Value Version of the DAPAS solution. It contains content about some details like the aim of the version, the provided functions and equipment as well as information about the installation. The different parts of the project will be presented individually, in order to have a complete and deeper vision of the whole system.

1.2. Relationship to other DAPAS deliverables

The deliverable is related to the following DAPAS deliverables:

Deliverable	RELATION
D2.1 User Requirements	This deliverable describes the user requirements and services for the DAPAS solution
D2.2 System Specification	This deliverable describes the system specification of DAPAS
D2.3 Rollout and Support Specification	The Rollout and Support Specification includes information related to the living environments of the clients and the plug and play capabilities of the packages
D3.3 Pre-Version	This deliverable describes the Pre Version of the DAPAS solution and is therefore related to this deliverable.
D3.4 Starter Version	This deliverable describes the Starter Version of the DAPAS solution and is therefore related to this deliverable.
D3.6 Premium Version	This deliverable describes the Premium Version of the DAPAS solution and is therefore related to this deliverable.

Table 1: Relationship to other DAPAS deliverables

2. Value Version

2.1. Objectives

The aim of the Value Version is to release the second version of the DAPAS solution following the Starter Version, taking into account the specified technical and functional requirements defined in "D2.1 User Requirements and Services", "D2.2 System Specification" and "D2.3 Rollout and Support Specification". The aim of the Value Version is to extend the DAPAS System to the end user and test the capability to install the hardware components themselves and the usability of the solution.

2.2. Installation

For the installation of the DAPAS Value Version the following elements are required:

- Hardware requirements
- Requirements for Value Version at Home
- User Manuals
- Manuals for responsible person on site for roll-out

The installation of the Value Version started with the 1st of October, 2020. The Value Version includes multiple new hardware and functions on the tablet. Moreover, the Value Version is an expansion of the Starter Version, hence, many functions are now interconnected. The DAPAS System can now be operated by the tablet and with the Emma Base Station.

Special attention, again, is put on the **Plug & Play Concept** at the homes of the participants. Therefore,

- specific **Training Sessions** have been completed with all end user organisations
- **User Manuals** have been created in a user friendly way
- needed **Hardware Components** have been prepared (configurations & stickers for user friendly installation)

In order to measure the effectiveness of the Plug & Play Concept, a questionnaire for the participants has been developed. More information about the actual installation process can be found in "D4.2 Installation Report".


Figure 1 & 2 : Installation of Value Version & testing with users (©RCS)

2.2.1. Hardware requirements

Hardware	Use
Internet	To provide connection to the backend
Tablet	To display the package to the client
Emma Base Station	As main gateway, emergency alarm system, in order to connect all components and products in one
Echo Dot (Amazon Alexa)	Voice recognition for communication tool of Emma Base Station
Motion Sensor	Voice output from Emma (e.g. messages and reminders)
Smart Lamp	Visual signal if Emma gives voice output and to control lamp by speech and by tablet
Lamp Socket	access to electricity for Smart Lamp
Power Strip	access to electricity for Emma Base Station, Echo Dot, Lamp Socket

Table 2 : Hardware for Value Version

2.2.2. Requirements for Value Version at Home

Component	Requirement
Internet	4G mobile internet available in all rooms or will be provided, Power outlet for router
Tablet	Power outlet for tablet charger

Power Strip	Power outlet for power strip. The power strip provides electricity for Emma Base Station, Echo Dot (Amazon Alexa), Lamp Socket

Table 3 : Requirements at Home for Value Version

2.2.3. User Manuals

In order for the end users to fully understand and comprehend all new functions, two different user manuals have been designed and created. The first user manual is the **Installation Instructions** and is designed in a user friendly brochure design. The purpose for this brochure is to help the end users to install the "Plug & Play" DAPAS- Systems by themselves. It is a step by step instruction, includes pictures and written instructions on how to place and plug in all new components. Moreover, the Installation Instructions gives a brief overview about the main components and what use they have.

Additionally, all responsible people at site (from end user organisations) follow the instructions in the **Technical Manual Overview for Trial Site.**

*Figure 3 & 4: Outtake of **Installation Instructions** for end users in LUX*

Secondly, all users got the **User Manual DAPAS VALUE VERSION**, which is an add on to the manual all end users got with the Starter Version. The User Manual includes all functions and updates, which are possible in the Value Version. The manual starts by explaining all new components and what they can be used for, then the manual goes on and explains very detailed how the voice control can be used (including dialogues on how to interact with Emma). Lastly, the user manual includes a detailed explanation about the new games and functions on the Tablet. The User Manual is designed in a very user friendly way (screenshots, different colors, font size etc.), so all end users can follow instructions easily.

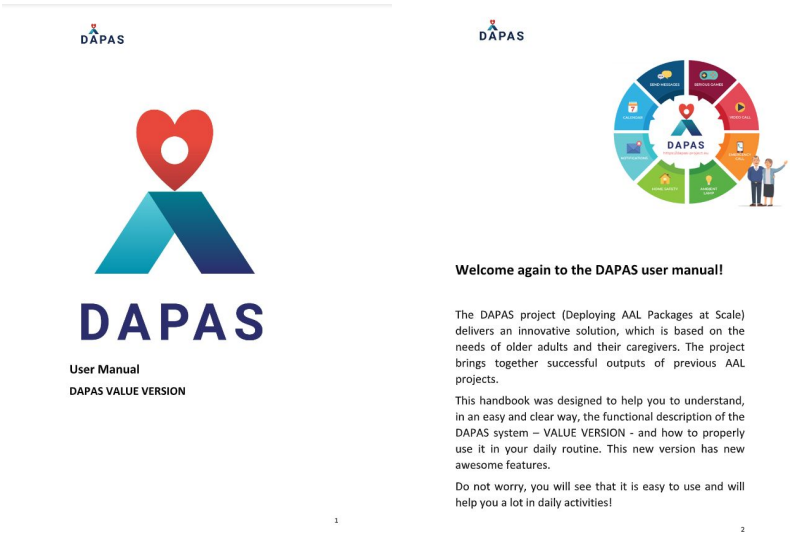


*Figure 5 & 6: Outtake of **User Manual DAPAS VALUE VERSION***

2.3. Final Product Functions

The DAPAS Value Version consists of new features on the tablet and new equipment for the home - all connected to one backend.

Figure 7: Emma Basestation

First and foremost, the **Emma Basestation** - an emergency equipment and smart home gateway. Emmais connected to the tablet and controllable through an external voice assistant (**Echo Dot Amazon Alexa**). Emma consists of a central control element with smart home functions (reliable standard connections such as 868,3 MHz Frequency, BLE and zigbee), a communication module to allow voice output and thirdly, Emma has an integrated Emergency Kit and is hence labeled as an home emergency device.

Functions such as medication reminders, drink reminders, voice and text messages to contact people through the Kwido Caregiver App, emergency calls, and receiving of messages from contact persons is now possible with Emma AND the tablet. For example, the users can send a message to their contact person by voice “Computer, start Emma Help and send a message to my daughter Anna”. The dialogue then proceeds and the message is sent to the according contact person with the Kwido Caregiver App. Once the relative responses, the user can either listen to the message through Emma (voice output) or read the message on the tablet in the DAPAS App. Importantly, all voice outputs are given by Emma not by the external voice

control. The external voice control is needed to activate Emma by voice and process the speech for Emma to understand.

Figure 8: Motion sensor

Secondly, the Value Version includes a **motion sensor**. The motion sensor is a pivotal part of Emma and ensures that users do not miss any voice outputs/ messages given by Emma. The motion sensor is located near Emma and if motion is detected Emma knows the user is near and can now speak to the user. As an example, the medication reminder is set for 07:00 AM but the person is still in the bathroom but walks by Emma at 07:03 AM and now Emma reminds the user to take the medication.
Thirdly, a **smart lamp** is included to give visual signals if Emma is about to speak and to use the lamp as for example a night light. The light is connected with Emma and the tablet, hence can be activated and deactivated by the tablet in the DAPAS Launcher and by voice. “Computer - start Emma help and switch off the light for me”.

The **power strip** and **lamp socket** are needed to have a fully functioning and encompassing system offered to all users.

The DAPAS Value Version provides several features summarized in the following table:

Features
24/7 Call/ Emergency Service by voice and button
Medication Reminder by voice and by tablet
Sending of Messages by voice and by tablet
Appointment Reminder by voice and by tablet
Drink Reminder to stay hydrated
Serious Game - Cubbie
Serious Game - UnlockIt
Well-being Dynamic Questionnaires
Smart Lamp
Video Upload
Pictures Upload

Table 4: Features Overview of the Value Version

2.3.1. DAPAS Launcher

After login into the DAPAS Launcher the user will have access to all features through the Launcher. The Launcher is adapted to the Value Version. As shown in the screenshot below the ***Wellbeing*** and ***Tools***

Feature is new. The Communication Feature includes now the option to see Videos and Pictures sent by the Caregiver App (see 2.3.9 Video and Pictures). The Games Feature includes new games (see 2.3.7 Games).

Figure 9: Screenshot of DAPAS Launcher

In the new version of the tablet app, you can now include new features for the value version just by choosing the "Value Version" mode in the configuration.

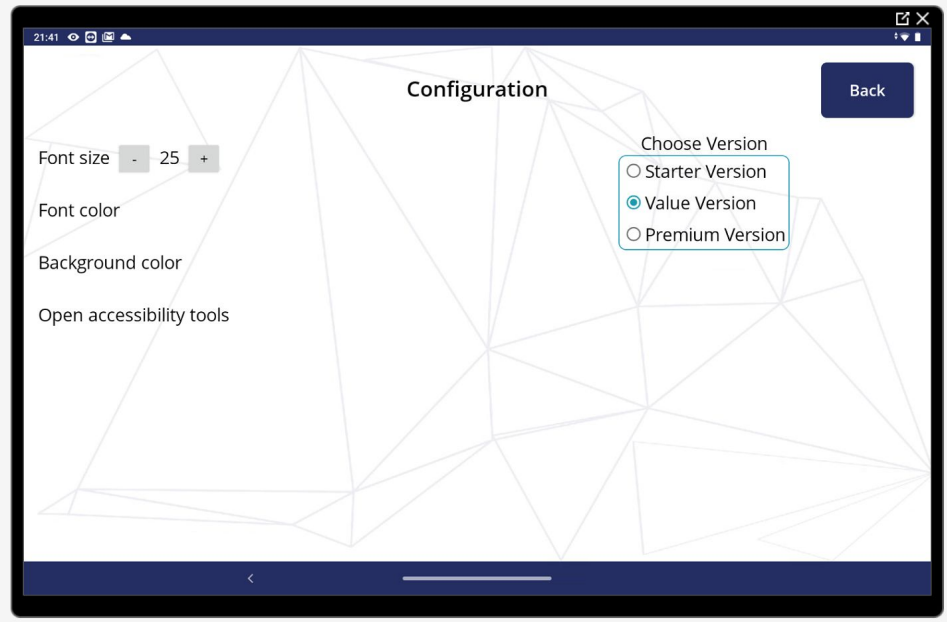


Figure 10: Screenshot of DAPAS Launcher - Configuration

2.3.2. 24/7 Call/ Emergency Service

Figure 11: Emergency button

An important feature: the emergency call. Emma is a base station with a direct connection to the Red Cross emergency centre (AUT). If you need assistance, any day any time, you can ask for help using the base station. The emergency call can be triggered by pressing a button on the base station or by voice. This is important in case of emergency, like by falling or feeling unwell overall. Especially now during the pandemic and limited access for relatives to visit the elderly, an emergency call system is important to feel safer at home.

2.3.3. Medication Reminder

Emma informs the user to take the medication at the right time. The reminder can be set with the tablet or by voice.

In a dialogue the user continues to speak to Emma and give her the right time of the day to take the medication. There are medication reminders for in the morning, midday and in the evening.

Moreover, Emma asks the user to confirm the medication intake. When the medication has been taken the user simply activates Emma by voice and tells her that the medication has been taken.

2.3.4. Sending Messages

Relatives of users with a smartphone (android and iOS) can be added as contacts on the tablet (Starter Version only android was possible). Emma can now receive and send messages by voice.

When someone sends the user a message, Emma speaks out received messages as soon as movement is detected in the room and the smart lamp blinks before the message will be said. The message includes the name of the contact and the content of the written message. The message could be:

"Gertrude, Else sent you this message:"

"Hello grandma! I'll stop by this afternoon at 2:00 PM for coffee and cake. I'm glad to see you."

2.3.5. Appointment Reminder

Emma is able to remind you of important events and information. For example Emma reminds the users for doctors appointments or simple tasks as to measure the blood pressure once a day. Again, the user just needs to talk to Emma to set the reminder.

Creating a new reminder by saying:

You say:

"Set up appointment reminder"

or

"Remind me in 10 minutes" / "Remind me at 2:30 PM"

Then the user tells Emma how often he/she needs to be reminded and what the reminder is about (e.g. Doctors Appointment at Park Avenue). Emma will remind the user about the appointment at the selected time and when you are in the room (when movement is detected).

In connection to the appointment reminder, the launcher now also gives the opportunity to create recurring events.

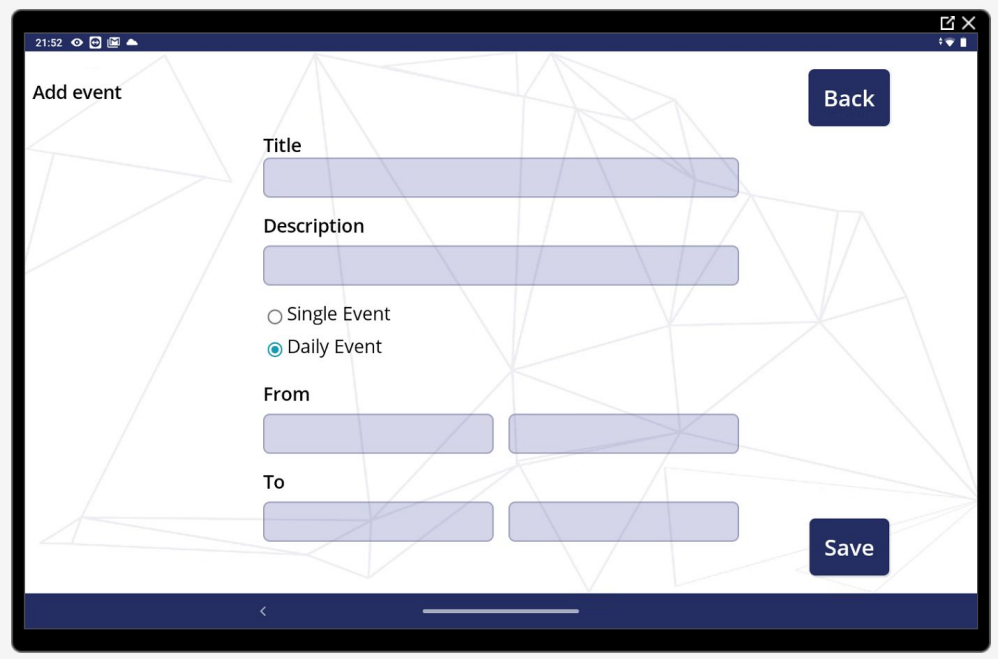


Figure 12: Screenshot of DAPAS Launcher - Appointment reminder

Moreover, the Calendar on the tablet now offers a daily, weekly and monthly view.

Figure 13: Screenshot of DAPAS Launcher - Calendar

2.3.6. Drinking Water Reminder

As drinking water is often forgotten the Emma Basestation and the tablet remind the users to drink water. An interval is selected in a conversation with Emma. Users can choose between two, three or five reminders to drink water throughout the day.

2.3.7. Serious Games

Figure 14: Menu with all the games included in DAPAS

The objective of the new games included in the value version, as in the games included in the starter version, is to exercise different brain capabilities, in order to maintain or improve the mental health of the elderly

people. With this objective, as seen in Figure 11, 2 new games have been developed: Cubbie and UnlockIt. Both of these games are maze style games, but in a different way, focusing on working on different capabilities while carrying out problem solving tasks.

As specified in previous sections, a user manual is included with the value version, in which instructions for the games are present too. Additionally, inside each game, it is included a tutorial, in order to show to the users all the possibilities of each game, how to interact with the UI, as well as understand how the game works, which are the objective/s and what to expect when performing different actions.

Cubbie

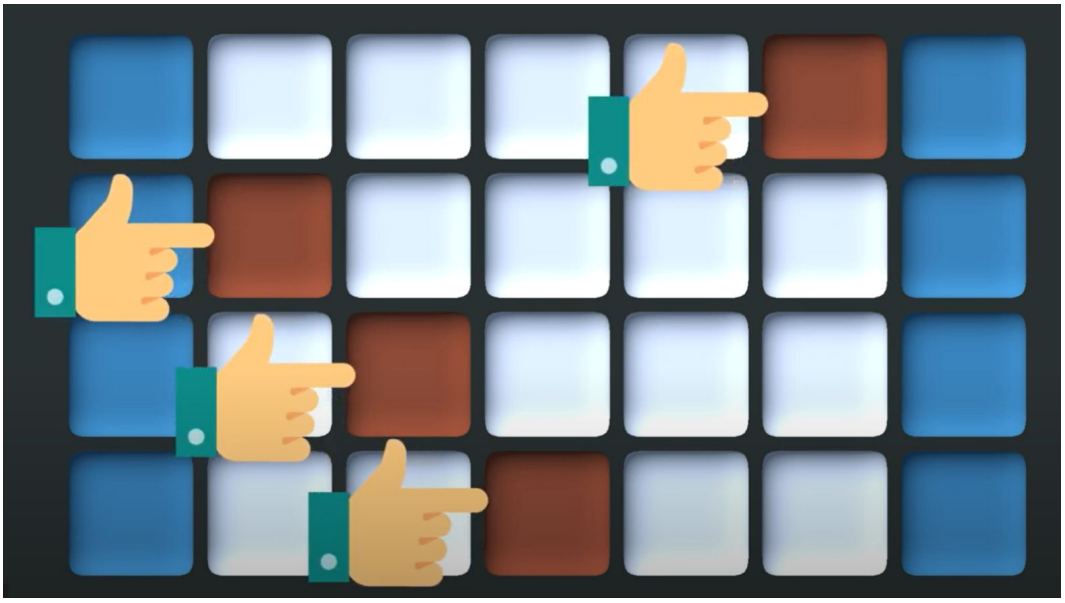


Figure 15: Screenshot of Cubbie's game tutorial

What is Cubbie?

Cubbie is a maze game where users have to find a path between sides avoiding obstacles, or select obstacles, as seen in Figure 12, taking into account that these are shown just for a short period of time.

Objective

The objective of Cubbie is to stimulate the memory, thinking speed and problem solving capabilities, while having fun playing.

How does it work?

The objective inside the game is to find the correct path from left to right taking into account the obstacles which are shown for a short time before. It includes another game mode, in which the objective is to select the obstacle previously shown, instead of trying to avoid them. There are different levels of difficulty, and the user will start from the easiest one, needing to complete several sequential randomly generated scenarios in order to complete a difficulty and continue to the next one.

UnlockIt

Figure 16: Screenshot of UnlockIt while playing an easy level

What is UnlockIt?

UnlockIt is a sliding piece puzzle, in which the objective is to free the path between the red car and the exit of the parking, as it can be seen in Figure 13. The difficulty comes from setting free this path interacting with other vehicles that are placed in the parking, which work as obstacles.

Objective

The objective of this game is the cognitive training of the player, specifically working the visual intelligence, problem solving capacity, logical reasoning and thinking speed.

How does it work?

The game is entirely self-directed, with over 40 leves that let players choose their degree of difficulty. There are 3 levels of difficulty available: easy, medium and hard. Once selected one of the difficulties, the player will start from the first level of the difficulty degree and go through all the scenarios, completing them in a secuencial way. Each level shows a different combination of vehicles, so a different problem each time. The player needs to move the vehicles through the scenario, in order to free the path between the red car and the exit. Only a forward and backward movement is possible, and taking into account the dimensions of the parking, and the size of the cars, finding the needed configuration can be very challenging, as the vehicles block the movement of each other.

2.3.8. Well-being dynamic questions

Everyday at 10 AM users will automatically receive questions about their well-being on the tablet. Users have several answer options where they choose one option and then can move on to the next question.

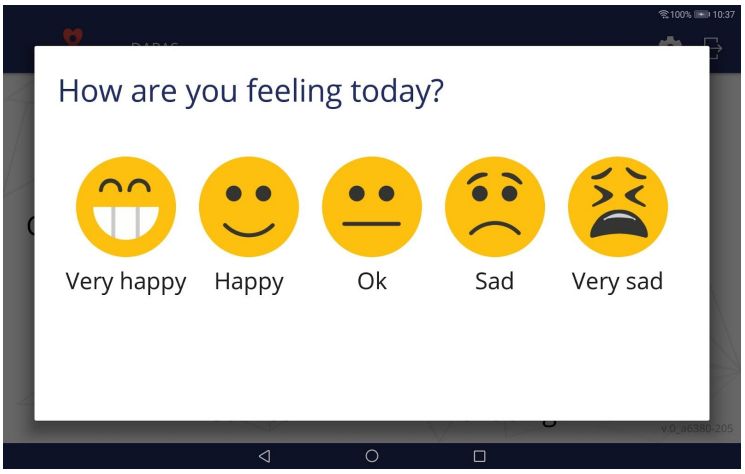


Figure 17: Screenshot of Wellbeing Questionnaire

2.3.9. Self-reported Wellbeing via dynamic SF-36 questionnaire

A feature in the Value-Version deals with dynamically asking questions included in the SF-36 questionnaire. This questionnaire is also known from the baseline assessments and can be combined into 2 summary measures: Physical Health and Mental Health. As the full questionnaire has 36 questions and it would be tedious to answer the whole questionnaire every few days. So the idea is to split up the whole questionnaire over two weeks. So the feature enables to answer only one to three questions at a time and saves the answers. The next day some of the missing questions will be displayed. After two weeks a complete set of answers is collected and a new “round” begins. As an additional measure the change in summary measures over time can be collected and analysed.
Everyday a reminder is sent to the tablet devices to start answering the questions.

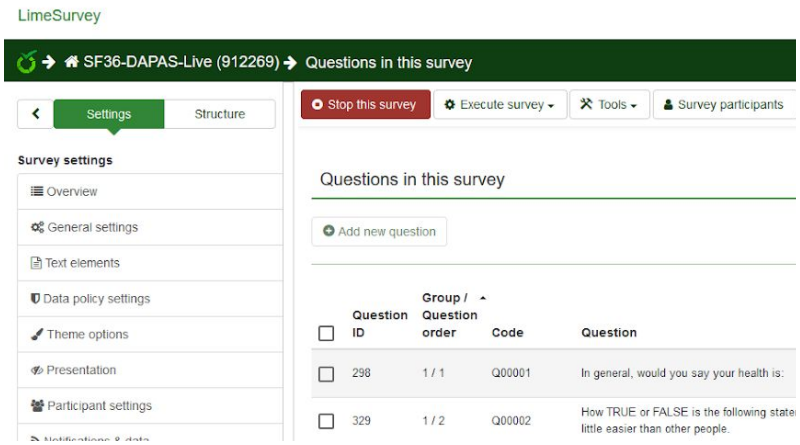


Figure 18: The server backend holding the questionnaires and related answers

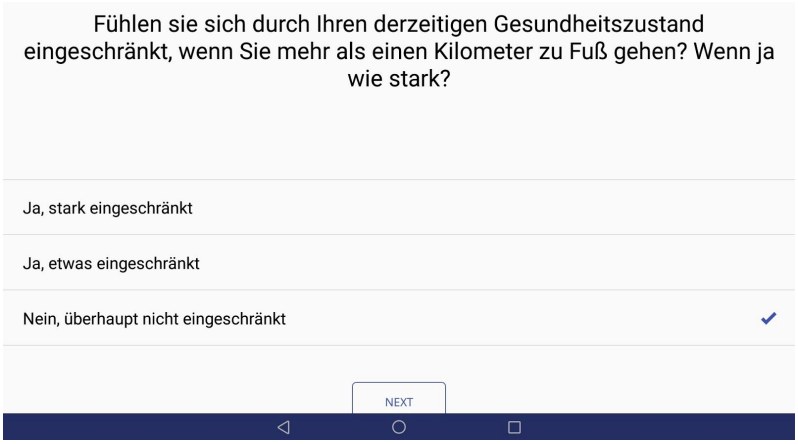


Figure 19: The integration of the questionnaires in the DAPAS launcher app

2.3.10. Smart Lamp

Another new feature in the Value Version is the inclusion of an ambient light. The smart lamp is connected to the Emma base station via a zigbee connection. Hence, it is possible to switch on and off the lamp with the DAPAS Launcher but also by voice. Furthermore, the ambient light is also integrated into the system to give a visual signal when a message/reminder is being given by Emma. For example, it is 8 AM and a medication reminder is set. The motion sensor detects movement of the participant, the ambient light blinks twice and then Emma starts to speak and reminds the participant to take the medication.

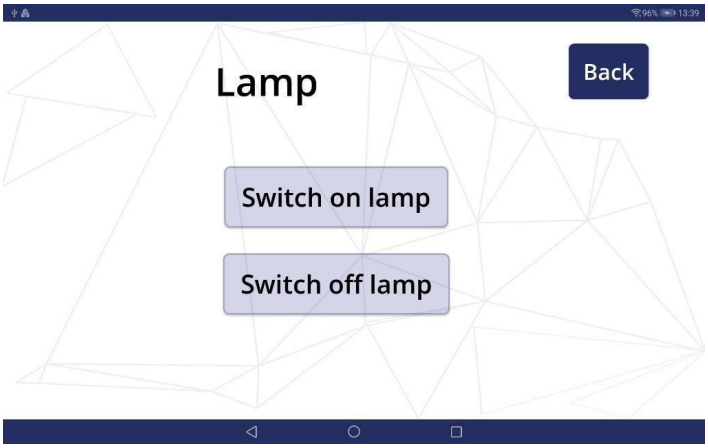


Figure 20: Smart Lamp in DAPAS Launcher

2.3.11. Video and Pictures

The DAPAS launcher has a new option to receive pictures shared from the smartphone app, on both iOS and Android systems.

From the communication option now users have access to the photos section, in which relatives and caregivers can create albums and upload pictures.

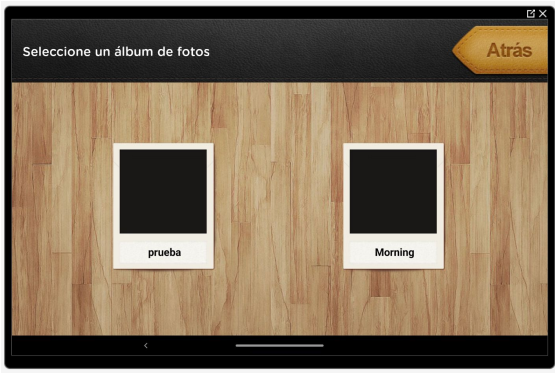


Figure 21 & 22: Communication in DAPAS Launcher

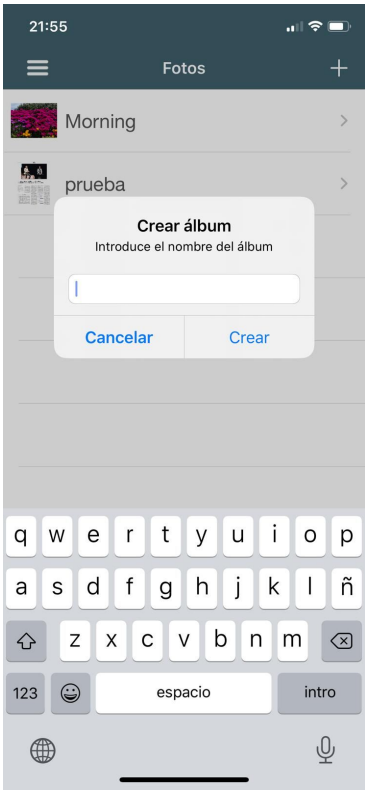
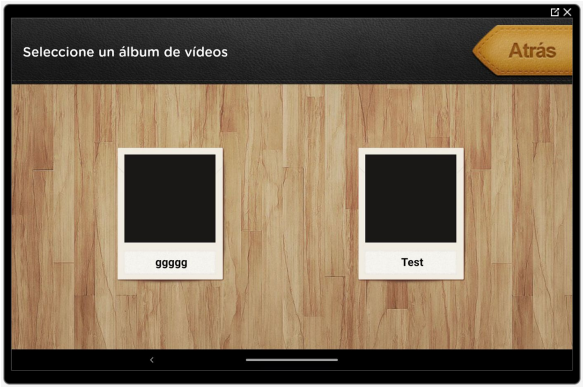


Figure 23: Creation of new Album to share Pictures

The same with videos, where you can upload videos to the tablet from the smartphone apps.



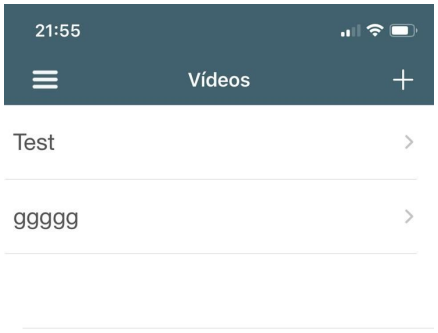


Figure 24 & 25: Creation of new Album to share Videos

2.3.12. New caregivers' app for iOS

With this version, IDE has created a new app for Apple iPhones which can be downloaded from App Store and is called "Kwido for Caregivers". It may be used for connecting with the DAPAS system as it was before using Android smartphones.

Figure 26: iOS KWIDO Caregiver App

2.4. Feedback

During the usage of the DAPAS Value Version we are continuously gathering feedback from the users. We have introduced a support process to handle upcoming bugs or requested features. The participants are able to inform about those bugs and requests every time. Bugs are corrected immediately and as quickly as possible. Feature requests are collected and analyzed and then decided if they will be implemented. Those changes will be effective after the version changes. Bugs are included into a ticket system. Feature requests are collected in an excel sheet and then analyzed and decided if they will be implemented for the next version change. With that process we are getting constant feedback and are able to improve our system continuously.

2.5. Conclusion

The Value Version of DAPAS has been successfully released, including the development, adaptation and integration of the different functions of the product. For this task, the specified user requirements and system specifications have been taken into account, applying them in the development and integration part. The product has been successfully installed, so the users will be able to test the different functions of DAPAS, including the call/emergency service, medication reminder, sending of messages and appointment reminder, all by voice and by tablet, as well as the drink reminder, serious games Cubbie and UnlockIt, well-being dynamic questionnaires, smart lamp, video upload and picture upload.