POWER2DM

"Predictive model-based decision support for diabetes patient empowerment"

Research and Innovation Project
PHC 28 – 2015: Self-management of health and disease and decision support systems based on predictive computer modelling used by the patient him or herself

POWER2DM D3.8 (or 3.4.2)

Web-Based GUI Components for DSS

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SRDC	SRDC Yazilim Arastirma ve Gelistirme ve Danismanlik Ticaret Limited Sirketi	Turkey
LUMC	Leiden University Medical Center	Netherlands
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iHealth	iHealth EU	France

EXECUTIVE SUMMARY

In the scope of Task 3.4 "Web and Mobile User Interfaces for Behavioural Change Interventions" the user interface for the Web-based module in P2DM were specified. This document describes the Graphical User Interface (GUI) of the Action Plan Engine, the Web-based self-management component for the patients. The document comprises the following sections:

Chapter 2 gives an overview of the concept of the Action Plan Engine.

The chapters 3-7 describe the GUI of the steps of the guided workflow of the Action Plan Engine. This is an iterative cycle consisting of four steps:
1. The Treatment Plan in chapter 3 refers to the treatment plan specified by the doctor and includes goals and activities.
2. Based on the treatment goals, the patient can specify a treatment goal in a more detailed way but also add additional personal goals. Chapter 4 describes these self-management goals.
3. Chapter 5 describes how patient can plan and manage activities based on calendar view. Different colours for activities indicate different states (e.g. completed, in future).
4. During the review period, the patient's activities are monitored and collected in journals (see Chapter 6).
5. Chapter 7 depicts how the Action Plan Engine gives feedback based on recorded patient data. This phase is called the review and comprises feedback regarding the overall performance, feedback on planned activities and goals and feedback on additional recorded data (e.g. sleep problems). Part of the review are also charts in order to visualise the recorded observations of patients.

Chapter 8 depicts some specific exercises for behaviour change. The Energy Battery is a metaphor for mood or energy problems, e.g. in case of low mood or too much stress, in case of sleeping problems. The Value Compass helps a user to examine what is important to him in life, how his diabetes relates to those important things and to find out how to integrate diabetes in his daily life positively. The Relaxation Tips is an editor and provides a user with his own personal tips in stressful situations.

Chapter 9 refers to the Information Material. This are detailed articles about diabetes and management organised with WordPress.

The user options are describes in chapter 10 und refers to the menu items for the user profile and the user settings.

Table of contents

1   INTRODUCTION

1.1   Purpose and Scope

This document describes the graphical user interface of the Action Plan Engine, the Web-based module of P2DM supporting patient's self-management. The Action Plan Engine is a cyclic process for supporting self-management activities of diabetes patients and guides the patient through the different phases of diabetes self-management, namely specifying goals, planning activities, recording Observations of Daily Living (ODLs) and giving feedback based on the recorded patient data. The feedback comprises motivational messages and interventions for facilitating behaviour changes.

1.2   References
- D3.2 D3.1.1b – Dynamic Behaviour Change Intervention Models for Self-Management II
- D3.7 D3.4.1 – Mockups for the Web/Mobile User Interfaces
- D3.6 D3.3.1b – Action Plan Engine

1.3   Definitions and Acronyms

Table 1 List of Abbreviations and Acronyms

Abbreviation/ Acronym	DEFINITION
APE	Action Plan Engine
GUI	Graphical User Interface
ODL	Observation of Daily Livings
UI	User interface

2 OVERVIEW OF THE ACTION PLAN MODULE

The Web application of the POWER2DM platform is based on the Action Plan Engine (APE) developed in the EMPOWER project[1] and was enhanced in POWER2DM. The APE offers a guided workflow as an iterative cycle, typically on a weekly basis. If a patient specifies activities on a weekly basis, the likelihood that these activities are realistic is higher than planning activities for a longer period. However, the Action Plan cycle can also be bi-weekly, monthly or of another duration.

2.1 The Basic Idea

Basically the Action Plan Workflow comprises four main steps (see Figure 1)

(1) Specifying long-term self-management goals based on the treatment plan specified by physicians
(2) Specifying short-term (e.g. weekly) activities based on the treatment plan and self-management goals
(3) Collecting patient data (so-called Observations of Daily Living ODLs) recorded through mobile devices and Web forms
(4) Evaluating the weekly activities and collected patient data and giving feedback about the progress and tips for improvements and motivation.
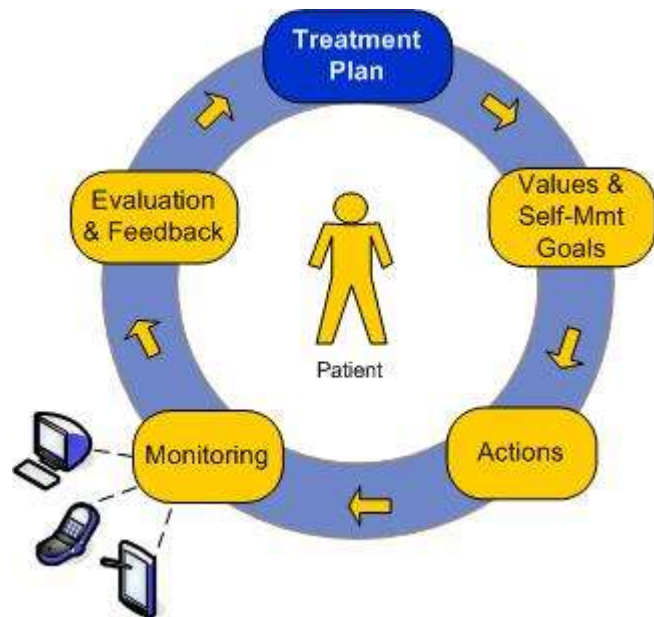
Figure 1: Action Plan cycle

Figure 2 shows the main menu and sub-menus of the Action Plan Module. The distinct menu items are as follows:

- **Treatment Plan:** Lists the personal treatment goals and activities from the doctor. The treatment plan cannot be edited; instead, active ones (highlighted in blue) can be adopted to self-management goals. The self-management goals are the basis for planning self-management activities that can be scheduled and display in a calendar.
- **Action Plan**: Allows to review and to specify personal goals, typically based on the doctor's treatment plan, opens a calendar with activities, offers a review of the past activities and give access to charts. In addition, it contains three tools, the Energy Battery, the Value Compass and the Relaxation Tips.
- **Journal**: Collects and reviews patient data.
- **?**: Provides additional information with respect to diabetes and its implications and includes a user manual
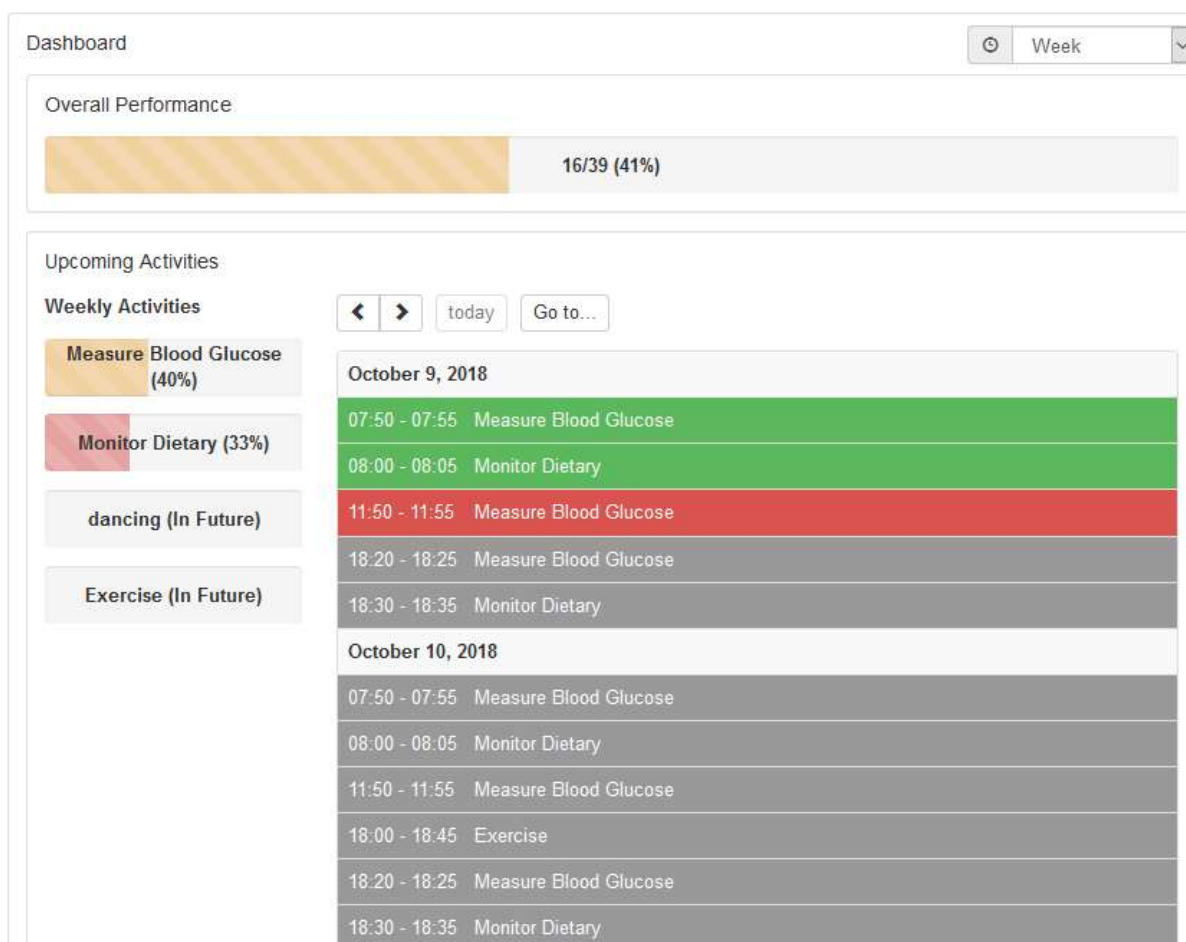- **<user name>**: Includes the user profile, the settings for the Action Plan Engine and the button to sign out

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[1] https://www.empower-fp7.eu/
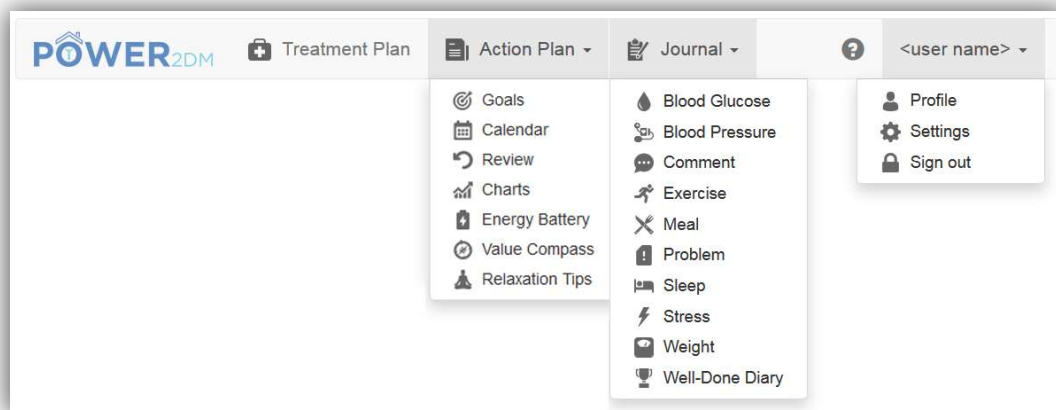
Figure 2: menu bar overview

The POWER2DM logo (see Figure 3) within the menu bar opens the home screen again. The homepage includes a dashboard with an overview of the most important data for the current week

Figure 3: APE dashboard

All items are colour coded using the following pattern:
- Green – Everything is complete/okay
- Orange – Something should be in progress at the moment

♦ Red – Something is incomplete/wrong
♦ Grey – Something to come up in the future / additional information

The items to be shown at the dashboard can be configured in the settings.

A description of the technical aspects of the GUI of the Action Plan Engine can be found in Deliverable D3.6 "Action Plan Engine".

3 TREATMENT PLAN AS STARTING POINT

The first step of the workflow will be to have a look at the treatment plan. A treatment plan comprises a treatment goal, if useful one or more treatment activities related to the goal, a target value, a valid period and the person who specified the treatment plan (see Figure 4).

The treatment plan lists the personal recommendations from your doctor. Those recommendations can not be edited but active ones (highlighted in blue) can be adopted to your goals and calendar.

Treatment Plan

Start Date	Target Date	Target Value	Treatment Goal	Treatment Activities	Ordered By
2017-01-08	2017-12-31	Medication Adherence 90%	Adhere to your medication plan and log your insulin intakes!	-	Javier Delgado
2017-01-08	2017-12-31	BGM Adherence 90%	Adhere your blood glucose monitoring schedules!	• Measure Blood Glucose	Javier Delgado
2017-01-08	2017-12-31	HbA1c 7%	Our main aim is to decrease your HbA1c to 7.0	-	Javier Delgado
2017-01-02	2017-12-31	Medication Adherence 100%	Adhere to your medication plan and log your insulin intakes precisely...	-	Javier Delgado
2017-01-02	2017-12-31	Average Daily Carbs 90g	Log your carbohydrate intakes precisely!	-	Javier Delgado
2017-01-02	2017-12-31	Log Exercises	Log your exercises (walking, running, swimming, etc)!	-	Javier Delgado
2017-01-02	2017-12-31	HbA1c 7%	Our goal of HbA1c for your next visit	-	Javier Delgado
2017-01-02	2017-12-31	HbA1c 7%	Our goal of HbA1c for your next visit	-	Javier Delgado
2017-01-02	2017-12-31	BGM Adherence 100%	Strictly adhere the KADIS BG monitoring protocol as planned!	• Measure Blood Glucose	Javier Delgado
2017-01-02	2017-12-31	-	Strictly adhere the KADIS Data Collection action plans to be ready for KADIS Metabolic Fingerpring identification process	-	Javier Delgado

Figure 4: Treatment Plan

Treatment Plan consists of one or more Treatment Goals. A Treatment Goal can in turn include one or more Treatment Activities suggested by the patient's doctor to help achieve his/her treatment goal. The Start Date and the Target Date indicate the valid period for a Treatment Goal. The Target Value indicates what the Treatment Goal aims to achieve.

The patient can adopt a Treatment Goal to his personal self-management goals or schedule a Treatment Activity in the calendar. He can also refine the planning, e.g. adding a more detailed description to the goal or adapting the schedule for the activity.

4 ADDING PERSONAL SELF-MANAGEMENT GOALS

Based on the treatment goals, the patient can specify a treatment goal in a more detailed way (e.g. specifying the type of exercise he would like to do) but also add additional personal goals. They are called self-management goals and gives an overview of already defined self-management goals. Self-management goals are described by

- ♦ Start Date and Target Date – indicate the valid period of a Goal
- ♦ Goal – describes the goal itself
- ♦ Related Treatment Goal – refers to the related Treatment Goal specified by the doctor
- ♦ Description – includes a more detailed description of a goal
- ♦ Motivation – for writing down what motivates the patient to fulfil this goal (e.g. motivating ideas for when the patient finally have reached his goal).

New goals can be added by pressing the "Add" button; existing goals can be edited or deleted by clicking on the corresponding table row.

Some treatment goals from your doctor might be more general (e.g. "reduce weight"). In order to react to those you can set up more specific personal goals tailored to your lifestyle (e.g. "10 km running each week").

Goals

+ Add

Start Date	Target Date	Goal	Related Treatment Goals	Description	Motivation
2017-10-20	2017-12-03	walking 3x	-	-	-
2017-10-19	2017-12-03	Eat fish more often	-	-	-
2017-08-29	2017-12-10	relaxing	-	some relaxation exercises	I want to reduce my stress
2017-01-08	2017-12-10	Adhere to your medication plan and log your insulin intakes!	• Adhere to your medication plan and log your insulin intakes! (Medication Adherence 90%)	-	-
2017-01-08	2017-12-03	Adhere your blood glucose monitoring schedules!	• Adhere your blood glucose monitoring schedules! (BGM Adherence 90%)	daily	-
2017-01-02	2017-12-31	record carb intake	• Log your carbohydrate intakes precisely! (Average Daily Carbs 90g)	-	-
2017-01-02	2017-12-03	Log your exercises (walking, swimming, etc)!	• Log your exercises (walking, running, swimming, etc)! (Log Exercises)	-	-

Figure 5: Overview self-management goals

5 PLANNING ACTIVITIES WITH A CALENDAR

In the next step the patients plans and updated the activities for e.g. the upcoming week by using a calendar. The calendar view (see Figure 6) keeps track of all user activities with adjustable views (week, overview, 2-day) and activity type filters (completed, in progress, incomplete, in future, observation). Furthermore, completion rates are colour coded.
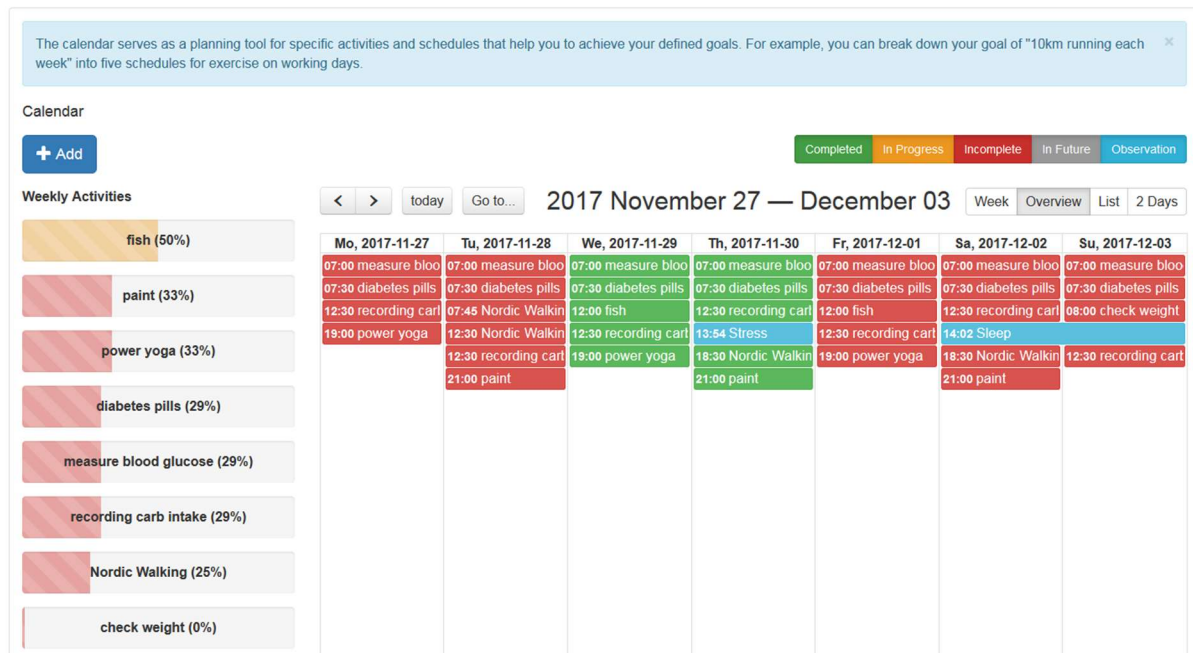
Figure 6: Calendar View

The purpose of the Calendar is twofold – It serves for the planning of activities supposed to help to achieve the goals defined before and if the planning of activities is done it gives an overview of already planned activities.
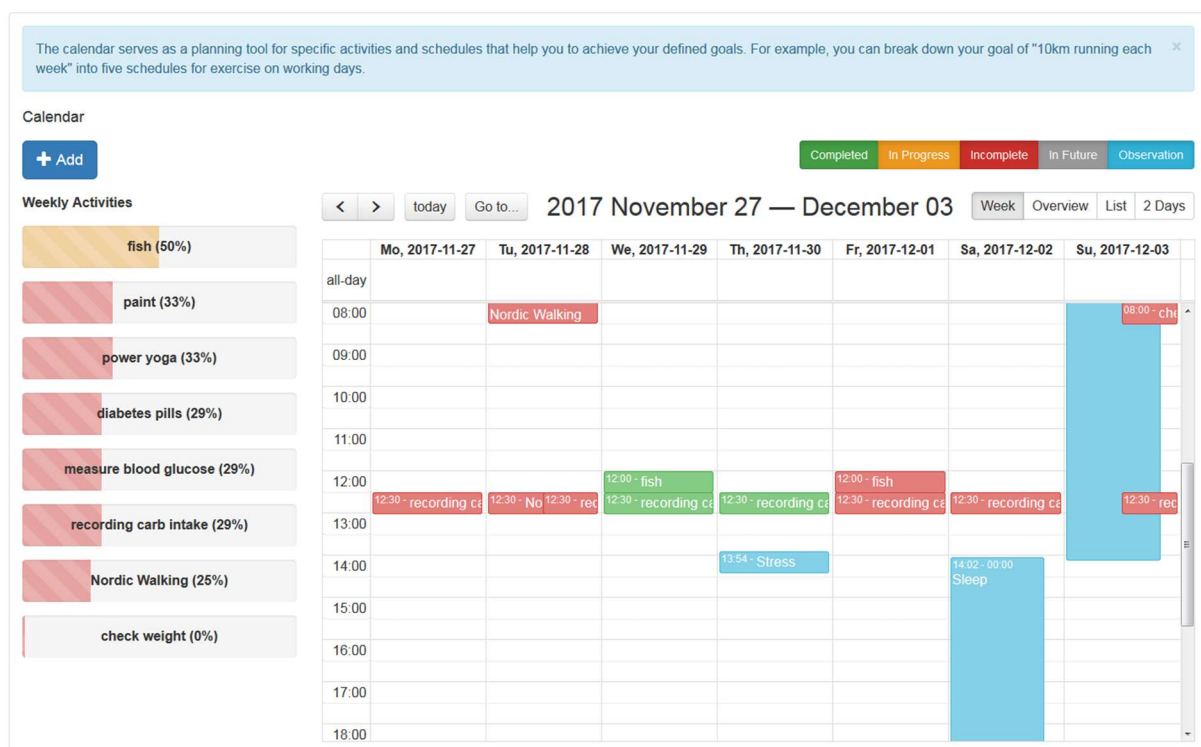
Figure 7: Calendar view (Week)

The Calendar Application lists all planned activities for the indicated period. The week may be adjusted by using the navigation arrows. New activities can be added by choosing the button "+Add" or clicking

on an empty calendar slot. Existing activities can be edited/deleted by choosing the corresponding activity on the left side of the Calendar.

The buttons on the top right side represent different states of an activity:
- Completed (green) – activities effectively performed
- In Progress (yellow) – activities that are currently performed
- Incomplete (red) – activities planned, but not performed
- In Future (grey) – upcoming and future activities
- Observations (blue) – additional observations recorded in a journal

By clicking on a calendar event, the patient can insert data (e.g. blood glucose values) to complete an activity for that scheduled time. When completed, the colour of the activity will turn from e.g. red to green.

Stored activities may be shown in different views:
- Week – presents a calendar view (see Figure 7)
- Overview – presents an overview of all activities for each day of a week
- List – presents a list view of all activities for the selected week
- 2 Days – presents an overview of two days (today and tomorrow)

By clicking on "+Add" or on an entry in the left column "Weekly Activities" a window for managing activities opens (see Figure 8). The patient can add new entries or edit or delete the respective entries.

Figure 8: Add an activity

The activity-related schedule is created in a separate window. By clicking on "+Add schedule" or on a table entry in "Schedule" a window will be opened (see Figure 9) in which the patient can add new entries or edit or delete the respective entries.

Figure 9: Scheduling an activity

6   COLLECTING DATA IN JOURNALS

During the week, patient data are recorded by devices but also manually through Web and/or mobile forms. This phase supports the self-monitoring of vital data and behaviour. The Action Plan Engine supports the collecting of the following items:
- Blood Glucose
- Blood Pressure
- Comment
- Exercise
- Meal
- Problem
- Sleep
- Stress
- Weight
- Well-Done Diary

By choosing a category (e.g. Blood Glucose, Exercise), the system lists all the stored entries of this particular journal category (see Figure 10 for Exercise). It is also possible to add a new journal entry by clicking on the "+Add" button. Any of the listed journal entries may also be edited/deleted by clicking on the corresponding row.

Figure 10: Journal - Exercise

6.1 Adding a new journal entry

Adding new journal entries is performed in a separate form that provides relevant input fields. Some of the input fields are optional, some mandatory. The latter are marked with a star "*". Depending on the journal type, the parameter for describing a journal entry differs.

Figure 11 shows the journal entry form for an exercise entry. Exercise entries are described by a start date, the duration of the exercise, a category referring to a list of predefined exercises (e.g. cycling, dancing, walking, soccer), the location ("where"), the intensity of the exercise based on a Likert Scale and a comment field.

Figure 11: Journal Entry Form - Exercise

7   GIVING FEEDBACK WITH THE REVIEW

At the end of the week (or when the patient wants to ask for feedback) the Action Plan Engine evaluates and gives feedback how successfully the patient has fulfilled his planned self-management goals and

activities. This includes feedback about the overall performance, of the performance of all concerned self-management goals and activates. To give a quick overview, only those goals and activities with a top high performance (for fostering motivation) and those with top low performance (where the patient should take attention) are presented. For a detailed view, the user expands the list.

Additionally, the Action Plan Engine provides hints and advices (=interventions for self-management) for all activities and goals. Interventions can be in a different context, e.g. a tip for improving self-management activities, a workflow for identifying problems related to diabetes (e.g. too less exercise because the patient is scared of having a hypo) or a motivational message.

7.1 Starting the review & Overall Performance

The review starts with selecting the review period in the top right corner (see Figure 12). The default period is the past week, however longer periods are also possible (e.g. last month). Before the patient performs the review, he should check whether he has recorded all the data for the review period. For this reason, he can click on the button "Show/hide calendar" and fill in any forgotten entries.

The first feedback is the Overall Performance indicates how successfully the patient has completed his planned activities in total within the review period. Depending on the degree of fulfilment, a tip is additionally displayed.
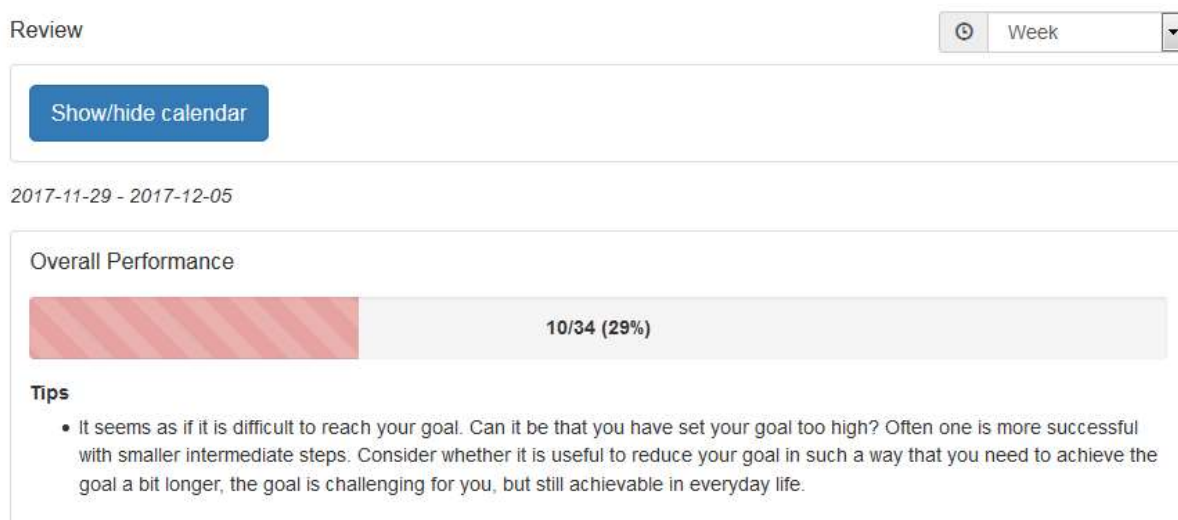
Figure 12: Review – calendar & overall performance

7.2 Activity Feedback

Next, the system provides feedback how successfully a patient has completed his planned activities for each category (see Figure 13). The column "Performance" describes the performance in percent (e.g. 43%) and indicates the number of completed activities (e.g. "3/7" means 3 activities from 7 activities were completed). The column "Tips" either acknowledges the patient's progress as a motivational message or provides tips for improving the patient's diabetes self-management.

Figure 13: Review – Activity Feedback

7.3 Journal Feedback

The review menu item gives also feedback (tips) on data that the patient has recorded additionally to the planned activities. These type of data are recorded in specific journals such as for sleep, stress or problems (see Figure 14).

Figure 14: Review - Journal Feedback

7.4 Goals Feedback

Typically, activities are associated to personal goals. This step (see Figure 15) presents the patient an overview how successfully he has met his planned goals (treatment goals and self-management goals) with the activities within the review time-range.

The column "Performance" describes the performance in percent (e.g. 43%) and indicates the number of completed activities that are related to the associated goal (e.g. "3/7" means 3 from 7 activities have contributed to the associated goal). A goal can be related to one or several activities. The column "Tips" acknowledges the patient's progress and provides tips for improving his diabetes self-management.

Figure 15: Review – Goal Feedback

The button "Goal Problem Identification" aims to support a patient in case he has a problem to fulfil one of his goals. It opens a workflow guiding the patient with several questions to help better identify the problem that hampers his progress. The workflow is based on decision trees covering five typical problem areas of diabetes patients:
- Exercise
- Glucose monitoring
- Meal /Carbohydrates

- ♦ Insulin management
- ♦ stress

These decision trees are described in detail in Deliverable D3.2 / D3.1.1b "Dynamic Behaviour Change Intervention Models for Self-Management". Once the problem is identified, the Action Plan Engine suggests an intervention to cope with the problem. Figure 16 depicts the branch of such a decision for "too little glucose monitoring because the patients fears needle" and suggest an appropriate intervention.

Figure 16: Goal Problem Identification

7.5 Charts

Different types of charts support the visualisation of the recorded observations and the evaluation of personal improvement respectively. To display a diagram, it is required
- ♦ to specify the time range in the select box in the top right corner and
- ♦ to select the chart type (select box "Chart Type").

Possible categories are glucose monitoring, blood pressure, exercise, meal, sleep, stress and weight
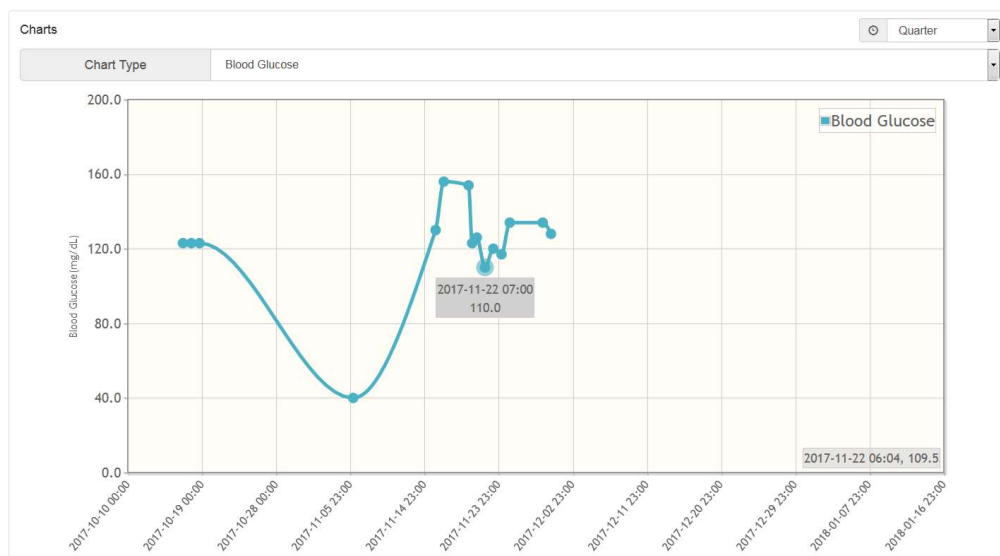
Figure 17: Charts

8 SPECIFIC EXERCISES FOR BEHAVIOUR CHANGE

8.1 Energy Battery

The Energy Battery is a metaphor for mood or energy problems, e.g. in case of low mood or too much stress, in case of sleeping problems, if the user feels basically tired or if the performance of exercises is low. A typical situation is when people are depressed and they stop active relaxation and sleep less. The basic assumption of the Energy Battery is that sleep increases energy level and that active relaxation gives the most energy. The Energy Battery is an exercise consisting of three steps:

Step 1 – Raising awareness: the user will be informed about the four categories of the Energy Battery (see Figure 18)
- ♦ Active relaxation – these are activities the user choses to do because he enjoys (or used to enjoy) them. These are activities in which the user is 'actively' doing something and feel mentally recharged afterwards, e.g. walking, dancing, going out with friends
- ♦ Passive relaxation – these activities help the user to calm down, relax, and maybe take his mind off things. Usually these activities are helpful after the ''must do's'' and after the ''active relaxations'', e.g. reading, watching TV, surfing the internet, taking a bath
- ♦ Sleep – getting enough sleep at night helps to recharge the battery for the next day, so the user can function well. Some people need more sleep than others need. In general, everyone needs between 6-10 hours sleep per night.
- ♦ Must do's – these are activities that the user does not really have a choice about, he needs to do them. Sometimes the user can feel fulfilled after doing them, but still they use up some/a lot of energy, e.g. work, cleaning your home, taking care of your health, caring for family or others

Figure 18: Energy Battery Step 1 - Raising awareness

Step 2 – Energy Diary: In the next 7 days, the user is asked to record what he is doing according to the four categories of the Energy Battery by using a calendar. The user is asked not only to relate an activity to one of the four categories but also to specify the type of activity. Figure 19 presents an example.

As it is very individual how much of his energy battery a user has spent on one of the four categories the Action Plan Engine asks the user to assess each of these categories whether a category was in balance or not before continuing with Step 3.

Figure 19: Energy Battery Step 2 - Energy Diary

Step 3 – Feedback: based on the user's assessment the APE gives a summary and feedback according the user's energy level (see Figure 20). Feedback also includes some advices how to increase the level of the user's energy battery in particular in case the activities for active relaxation are too low.
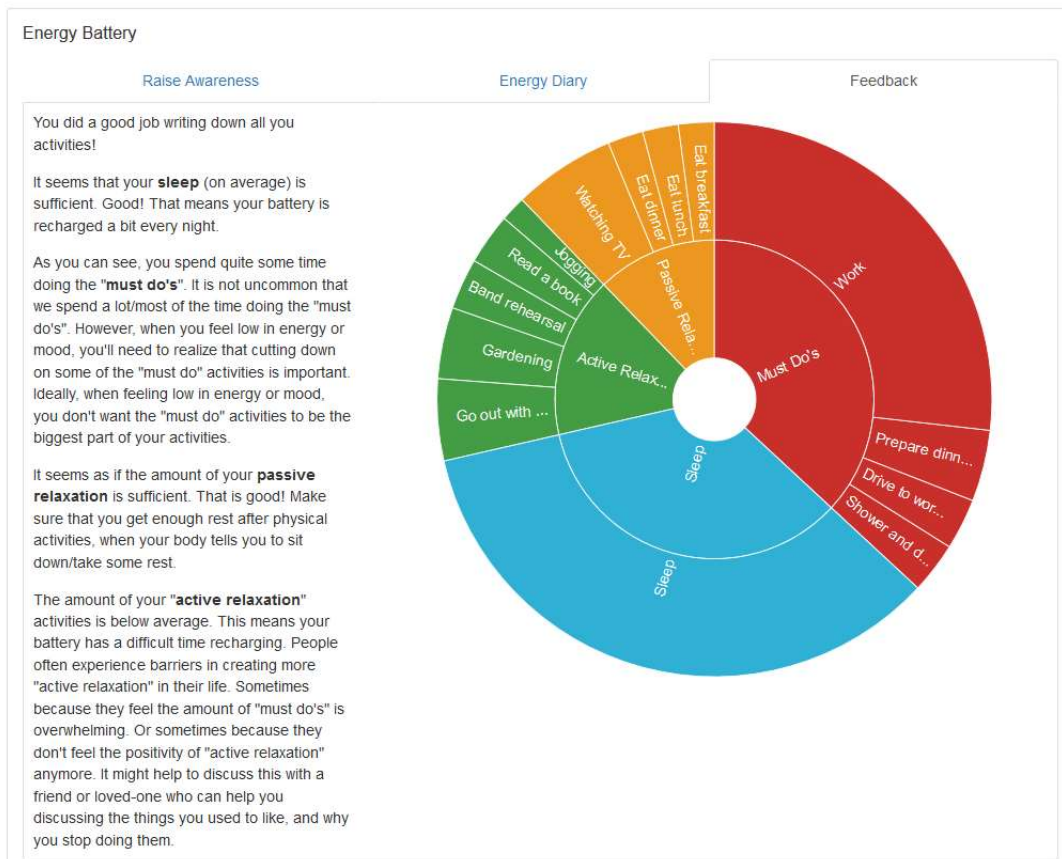
Figure 20: Energy Battery Step 3 - Feedback

8.2 Value Compass

People with diabetes are faced with the difficulty of integrating diabetes in their daily lives. Their personal goals in daily life (regarding family, work, sports, leisure) may conflict with their diabetes self-management. In addition, it may feel as if they constantly have to choose between their important personal goals and their health goals.

The Value Compass helps a user to examine what is important to him in life, and how his diabetes relates to those important things. The Value Compass guides a user through a journey by several steps for finding out how to integrate diabetes in his daily life positively, while doing all the things that are important to him. The exercise invites the user to think about the following questions by looking at one or several life areas (see Figure 21):

What would you want your life with diabetes to look like,
if you could choose how you took care of your diabetes without any limitations?

Figure 21: Value Compass – Life Areas

The user can select one or several life areas for brainstorming what is important to him in this area (see Figure 22). The quintessence of this process is summarized in a Key Sentence, which will be needed in the next steps of the Value Compass.

The user can start with any life area. However, the default life area is „health / diabetes /physical well-being" and the user should start with it.

Figure 22: Value Compass – brainstorming

In the next steps, the user rates how important these key sentences are for him (see Figure 23) and how content he is with them (see Figure 24).

Figure 23: Value Compass - rating importance

Figure 24: Value Compass - rating contentment

The results is prepared as a spider diagram (see Figure 25) giving the user a graphical overview how he has rated importance and contentment for his key sentences.
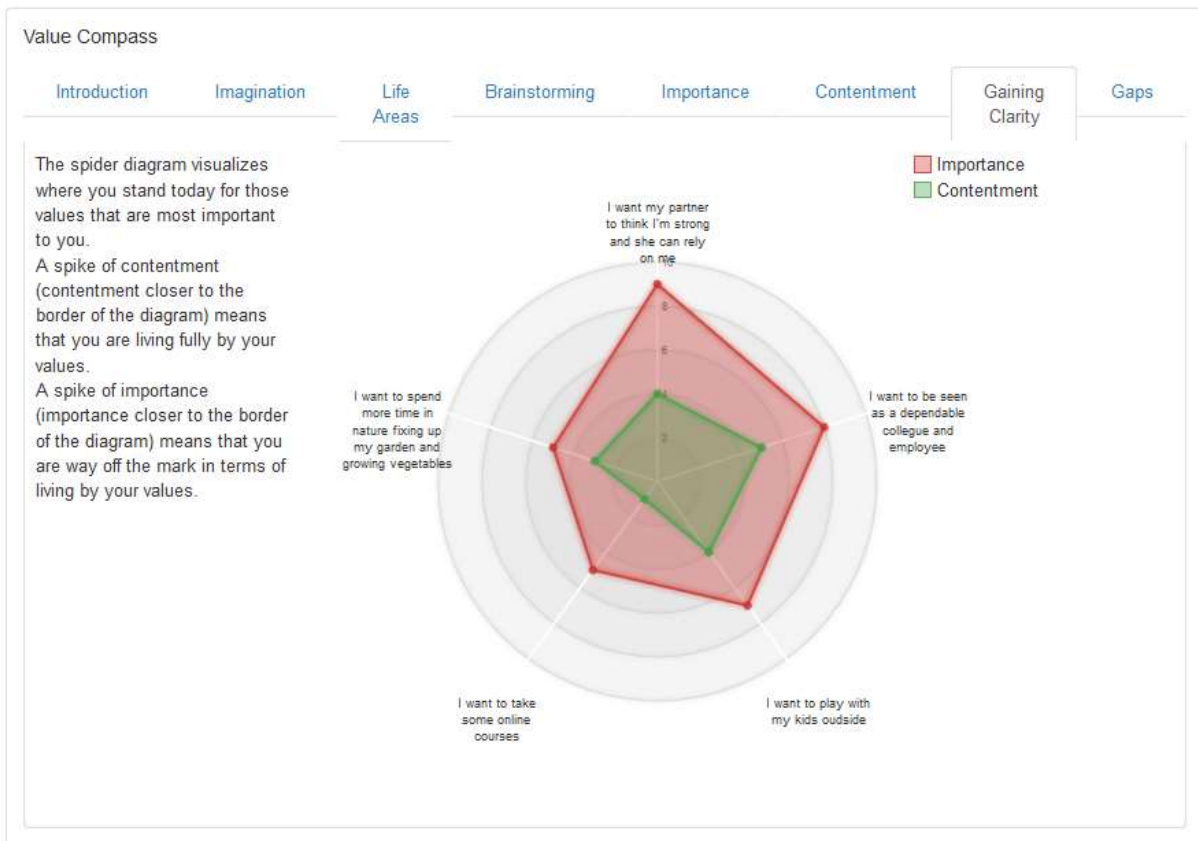
Figure 25: Value Compass - gaining clarity

In the final step (see Figure 26), the Value Compass presents an overview about those key sentences with high importance and low contentment. These gaps may indicate barriers hampering the user to live his values fully. The next step would be that the patient looks at these barriers. By clicking at one of his key sentences, the patient can add a goal for coping with the selected barrier.

Key Sentence	Life Areas	Importance	Contentment
I want my partner to think I'm strong and she can rely on me	Wife / husband / partner	9	4
I want to be seen as a dependable collegue and employee	Work / daily activities	8	5
I want to play with my kids oudside	Friendships / social life	7	4
I want to take some online courses	Education	5	1
I want to spend more time in nature fixing up my garden and growing vegetables	Health / diabetes / physical well-being	5	3

Figure 26: Value Compass – gaps

The conceptual background for the Value Compass can be found in Deliverable D3.2 / D3.1.1b Dynamic Behaviour Change Intervention Models for Self-Management.

8.3 Relaxation Tips

The relaxation tips help to provide a user with his own personal tips in stressful situations. He can revise, expand and prioritize this list according to his personal preferences.

Tip	Degree of relaxation
Exercise or walk	Very high
Listen to music	Very high
Spend time with friends or family	High
Play video games or surf the internet	High
Watch television or movies	High
Spend time doing a hobby	Medium
Take a nap	Medium
Pray	Medium
Read something	Medium
Go to church or religious service	Low

Figure 27: Relaxation Tips – list of tips

9 INFORMATION MATERIAL

The menu bar of the Action Plan Engine also includes a link to the Information Material. This is organised as a WordPress Website. For this reason we adapted the information material created in the FP7 project EMPOWER[2] to the national needs the two pilot sites in POWER2DM (Netherland, Spain).

Furthermore, we enriched Information Material by articles related to interventions recommended as part of the APE review. Interventions presented as part of the review are typically limited to 1-3 sentences. More detailed information for an intervention is stored as part of the Information Material and an intervention in the APE review includes a link to the related article in the Information Material.

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[2] https://www.empower-fp7.eu/
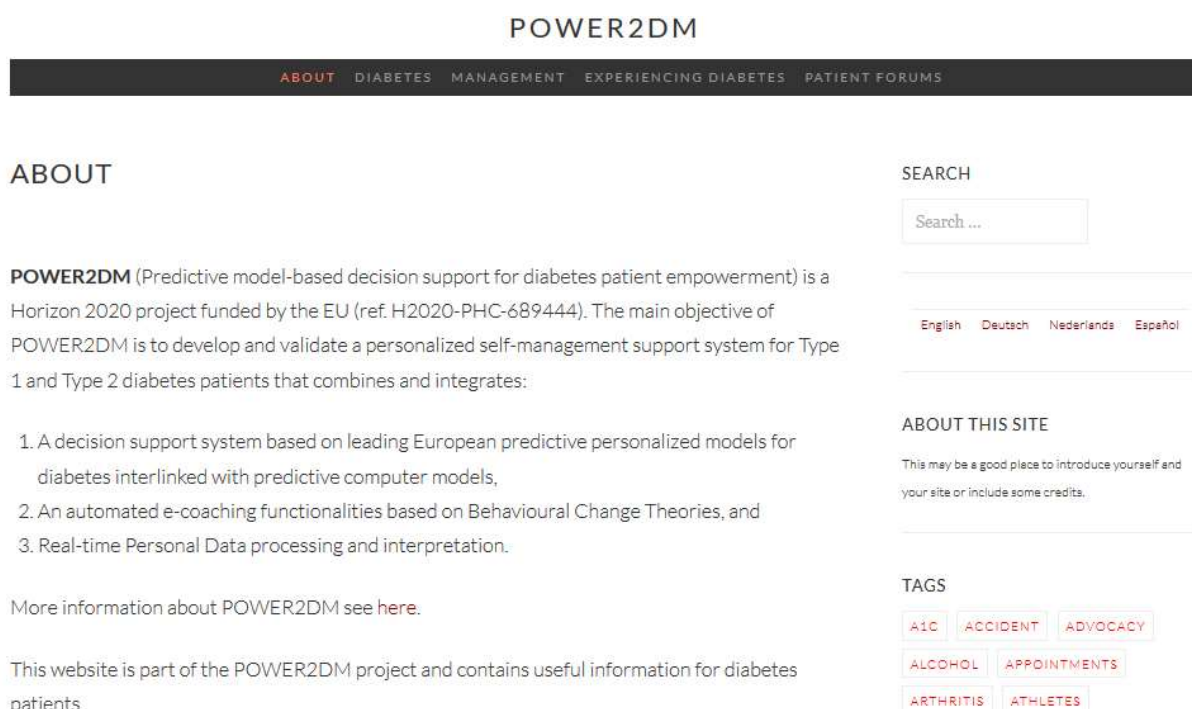
Figure 28: POWER2DM Information Material

A detailed information about the Information Material can be found in Deliverable D3.10 / D3.5.1 - Behaviour Change Intervention Contents.

10 USER OPTIONS

10.1 Profile

The Profile (see Figure 29) is used display to the user's personal information. It includes the username, gender, E-mail, date of birth, diabetes type, height and whether the user is smoking. The profile data is normally collected during the POWER2DM patient registration and cannot be edited by the user.

Figure 29: User Profile

10.2 Settings

In the Settings (see Figure 30), the user can make various adjustments concerning the display of the Action Plan Engine. He can configure the following items:

- **Language** – possible languages are English, German, Dutch and Spanish
- **First day of the week** – the user can insert the day of the week his calendar should start with
- **Dashboard elements** – the user can indicate which elements should be presented at his dashboard
- **Hypo Threshold** – indicates the threshold for low blood sugar (hypoglycaemia)
- **Hyper Threshold** – indicates the threshold when the blood sugar is too high (hyperglycaemia)
- **Blood Glucose Unit** – blood glucose can be measured in mg/dL (milligrams per decilitre) or in mmol/L (millimoles per litre)
- **Meal Unit** – possible meal units are gCHO (grams of carbohydrate) and BU (bread unit)
- **Tips** – the user can choose whether to maximize or minimize the tips for the different menu items.
- **Animations** – the user can indicate if various interactive user interface elements (e.g. progress bars, charts) shall be animated or displayed immediately.

Settings	
Language	English
First day of the week	Mo
Dashboard elements	☑ Upcoming Activities ☑ Charts
Hypo Threshold	72 mg/dL
Hyper Threshold	180 mg/dL
Blood Glucose Unit	mg/dL
Meal Unit	BU
Tips	Maximize
Animations	On

✔ Save

Figure 30: User settings

11 CONCLUSION

In the EMPOWER project we already developed the basic cycle of the Action Plan Engine (treatment plan, self-management goals, activities, journals and review). However, in POWER2DM we enhanced the Action Plan Engine substantially. The main focus was on the review process and to include interventions based on behaviour change techniques in an extensive way. More than 120 interventions

are available for the review. This is complemented by decision trees, which help patients to identify problems and then recommend appropriate interventions.

Specific exercises are another option to complement text-based interventions. Considering restricted time and resources for POWER2DM we selected two highly relevant exercises and implemented them in POWER2DM. One problem of diabetes patients is that the diagnosis sometimes hampers their vitality. The Value Compass helps to identify what is still important to them in their life and to live their daily life positively despite their diabetes. Another problem is that diabetes patients are often exhausted, tired or of low mood and lack the energy for taking care of their diabetes properly. For coping with this problem, we implemented the Energy Battery.

POWER2DM has extended the Action Plan Engine with extensive interventions designed primarily to help diabetics change their lifestyle habits for healthier diabetes management. However, future use may require the specification of further interventions or additional exercises. That can be integrated into the Action Plan Engine with minimal to medium effort.