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Authorship& Reviewer Information	
Editor	Mirka Evers (RRD), Simone Boerema (RRD), Sanne Scharenborg (RRD), Lex van Velsen (RRD) and Hermie Hermens (RRD)
Partners contributing	Sonja Müller (EMP), Roland Grunder (COMARG), Marios Zacharias (SiLO), Beatrix Zechmann (AIT)
Reviewed by	Tunde Kallai (COMARG)

Abbreviations

Abbrev.	*Description*
AAL	Ambient Assisted Living
AAL JP	Ambient Assisted Living Joint Programme
PWL	Physical Wellbeing Layer
CT	Cognitive Training module
KPI	Key Performance Indicator
OSES	Occupational Self-Efficacy Scale
WHO HPQ	World Health Organization's Heath and Work Performance Questionnaire
uMARS	User Version of the Mobile Application Rating Scale
ESM	Experience Sampling Method
TRL	Technology Readiness Level

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Executive Summary

This deliverable presents a detailed report of the field trials of PEARL, which were conducted by RRD, COMARG and SiLO. During these trials all PEARL modules were evaluated: 1. the E-Learning & Skills Development module, 2. the Physical Wellbeing module, 3. the Cognitive Training module, 4. the Task & Time Management module, and 5. the Task Switching module. This report includes the methodology applied during the trials, all findings and recommendations per evaluated PEARL module and the overall PEARL platform. The results can be used for the further refinement of the PEARL services and platform, both methodologically and technically.

The first chapter provides a short description about the role of the deliverable and its connection with other deliverables.

The second chapter includes a short summary of the evaluation framework of Jansen-Kosterink (2016), which forms the basis of the whole evaluation phase of PEARL. This framework is divided into four evaluation stages based on the maturity of the technology. Each stage has its own evaluation objectives, context, design and end-points.

Chapter three encompasses all information of the field trials, including a description of the methodology used and the findings and recommendations for the PEARL platform resulting from these trials. This chapter is divided into four sub-sections. Section 3.1 describes the objectives of the third field trials. Section 3.2 includes a description of the method, including the study design, the in- and exclusion criteria for recruiting the participants, the instruments and the procedure used during the evaluation. Section 3.3 describes data gathering, including the study parameters and tools to assess these parameters. Section 3.4 provides the analysis approaches, including the approaches of the tool analyses during the pre-test, the use of the PEARL platform, and the post-test. Section 3.5 provides a description of the results.

Chapter four summarizes the main findings resulting from the socio-economic evaluation.

And chapter five summarizes the main findings resulting from the third field trials. It emphasizes both the most important positive aspects of the evaluated PEARL modules and PEARL as a whole as well as the recommendations for improvement of the platform.

1 About this Document

1.1 Role of the deliverable

This deliverable includes a description of the method applied and the findings and recommendations resulting from the field trials. During these trials PEARL was provided to prospective end-users in the Netherlands, Switzerland and Romania/Greece. During these trials the participants could freely use PEARL for a minimum of two weeks in their own office environments. The results of these trials will be used for the further refinement/improvement of the PEARL platform and its modules. An overall conclusion of these results is provided at the end of the deliverable, summarizing the main findings and recommendations of the participants.

1.2 Relationship to other PEARL deliverables

The deliverable is related to the following PEARL deliverables:

Deliv:	*Relation*
D1.2	Ethical Guidelines: The ethical manual provides a set of guidelines that was applied during the field trials.
D2.1	Report on User and Stakeholder Requirements: this deliverable reflects the elicitation, consolidation and documentation of stakeholders' requirements (including older workers requirements) for the PEARL platform. The initial requirements from the end-users for the PEARL platform (as described in D2.1) are used to develop the first prototype of PEARL, which was evaluated during the first lab trials. The list of user requirements is adapted based on the outcomes of the first lab trials. A new prototype was build based on the adapted user requirements list, which was evaluated during the second lab trials with prospective end-users. A final prototype resulted from the second lab trials, which was tested and evaluated during the field trials.
D2.2	Use cases, Scenarios and Integrated Functionalities: this document describes scenarios and use cases which are based on the user requirements, resulting from T2.1 (reported in D2.1). These scenarios and use cases form the basis for the PEARL prototype, which is evaluated during the second lab trials. Based on recommendations resulting from the second lab trials, a new prototype was developed which was evaluated during the PEARL field trials.
D2.3.2	First PEARL User Interfaces: in this deliverable the first user interface of the PEARL platform and the module specific user interfaces are illustrated and described, which were evaluated during the second lab trials.
D2.4.1	Evaluation Plan and Sites Preparation: this report includes a general description of the protocol to be executed during the first- and second lab trials and field trials of PEARL.
D2.5.1	Report on First Lab Trials: this document presents a summary of the findings and conclusions resulting from the first lab trials, in which the PEARL platform was tested at mock-up level. The findings resulting from these trials were used for the further refinement of the PEARL platform, which resulted in a second prototype of a higher

technological maturity level. This prototype was evaluated during the second lab trials. Based on recommendations resulting from the second lab trials, a new prototype was developed which was evaluated during the PEARL field trials.

D2.5.2 Report on Second Lab Trials: this deliverable entails a detailed protocol description of the second lab trials (based on the general guidelines report in D2.4.1) and its forthcoming results. Based on recommendations resulting from the second lab trials, a new prototype was developed which was evaluated during the PEARL field trials.

2 Evaluation Framework

As a basis for the trials of PEARL we used an adapted version of Jansen-Kosterink (2016) (Figure 1) from the evaluation framework of Dechant, et al. (1996). The framework of Jansen-Kosterink (2016) specifies:

1) the evaluation stage (related to the stage in the design process of the service);
2) the evaluation objective (the focus points of the evaluation);
3) the evaluation context (how the service should be implemented in daily practice; the service configuration);
4) the evaluation design (experimental methods in the first stages and observational methods in the final stages); and
5) the evaluation endpoints (the potential added value of services depends on the technology used, the purpose and the service configuration).

Addressing these five aspects to the corresponding stage of evaluation was essential for the preparation of adequate protocols for the evaluation of the PEARL platform. A detailed overview, mapping the evaluation stages to the trials can be found in D2.4.1 Evaluation Plan and Sites Preparation. Each trial has its own objective corresponding with the design phase and evaluation context (standalone modules vs. implemented in daily working life) in which the technology is implemented and tested.

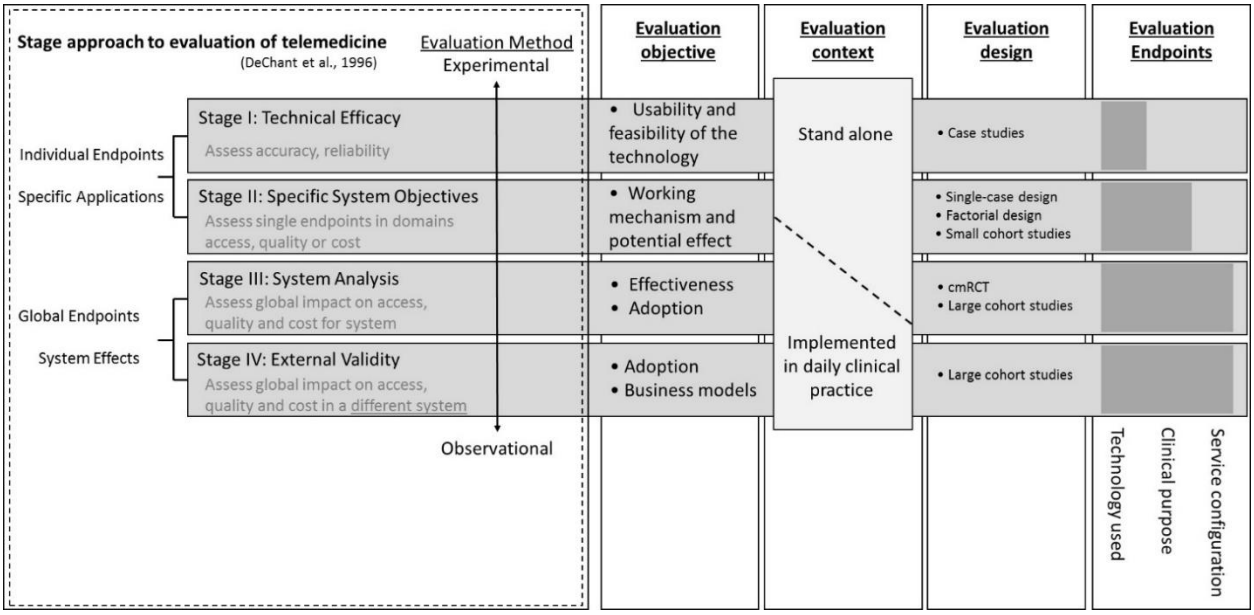


Figure 1. Evaluation Framework (Dechant e.a., 1996; SM Jansen-Kosterink e.a., 2016)

3 Field trials

3.1 The objectives of the field trials

The field trials of PEARL cover the third evaluation stage of the evaluation framework of Jansen-Kosterink (2016) (Figure 2). The primary aim of this stage is to investigate the **added value** of PEARL, which is determined by the 1. *user experience,* 2. the *usability*, 3. the *use,* 4. the *potential effect in daily working life*, 5. the *intention to use* PEARL by the potential end-users, and 6. the *economic outcomes*. By the potential effect in daily working life we mean:

- an increased level of worker productivity;
- an increased level of confidence of the employees;
- an increased level of satisfaction with the job as a whole and the work conditions.

The trials were conducted by three pilot organizations (RRD, COMARG and SiLO) and in 4 countries (respectively, NL, CH and RO/GR).

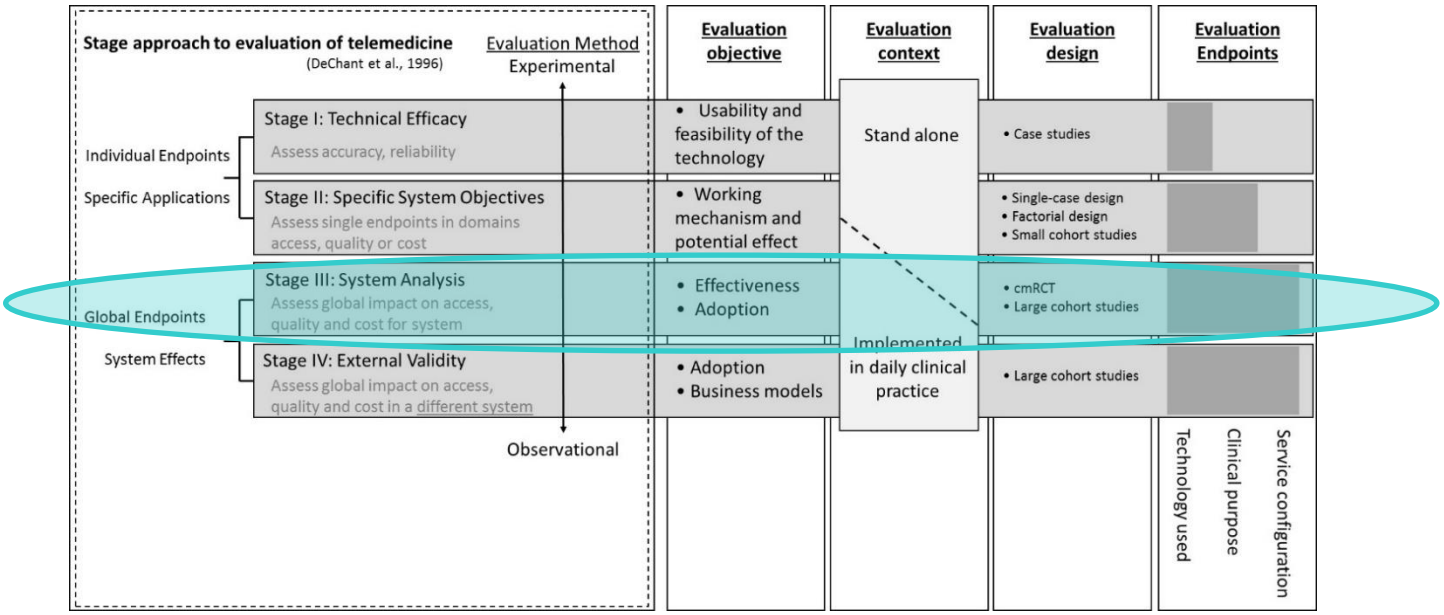


Figure 2. Evaluation Framework - Stage II (Dechant e.a., 1996; SM Jansen-Kosterink e.a., 2016)

During the third field trials all PEARL modules were evaluated. This included the:

- E-Learning & Skills Development;
- Physical Empowerment;
- Cognitive Training;
- Task & Time Management;
- Task Switching.

Table 1 provides an overview which maps the PEARL modules to the test sites where they were evaluated during the third field trials.

Table 1. An overview mapping the PEARL modules to the test sites in which they were evaluated during the third field trials.

		Stage 1	Stage 2	Stage 3	Stage 4	Objective	Evaluation Context	Evaluation Design	Maturity of technology
FIELD TRIAL	*Partner*								
FT3	RRD			■		Added value of PEARL, by means of: 1.user experience, 2. usability, 3. use, 4. potential effect in daily working life, 5. intention to use and 6. economic outcomes.	Embedded in daily working life	Prospective cohort study with a pre- and post-test (n≥15 per test site)	Integrated full PEARL setup
FT3	COMARG			■					
FT3	SiLO			■					

3.2 Maturity of the technology – Technology Readiness Level (TRL)

The technology evaluated during the PEARL field trials is a combination of various PEARL modules, as described in chapter 3.1 The objectives of the field trials. A detailed description of each module can be found in D4.5.2 Final Integrated Prototype. The maturity level of these modules is rated by means of the Technology Readiness Level scale (TRL)[1], which is provided by the European Commission. This scale includes 9 levels to determine the maturity of the technology, ranging from the idea (level 1) until a full working product, ready for commercial deployment (level 9).

All PEARL modules have a Technology Readiness Level between TRL 5 ‘Laboratory testing of integrated system’ and TRL 7 ‘Integrated pilot system demonstrated. An overview mapping the PEARL modules to their technology readiness level as they were evaluated in the field trials, is provided in Table 2.

[1] The **TRL** scale is a metric for describing the maturity of a technology. The acronym stands for **T**echnology **R**eadiness **L**evel. The scale consists of 9 levels. Each level characterizes the progress in the development of a technology, from the idea (level 1) to the full deployment of the product in the marketplace (level 9). See for more information:
http://www.innovationseeds.eu/Virtual_Library/Knowledge/TLR_Scale.kl

Table 2 Mapping the PEARL modules evaluated during the PEARL trials to their Technology Readiness Levels (TRL).

PEARL Module	TRL	Description
E-Learning & Skills Development Module	TRL 5	Laboratory testing of integrated system.
Cognitive Training Module	TRL 6	Prototype system verified.
Task and Time Management Module	TRL 6	Prototype system verified.
Physical Empowerment Module	TRL 7	Integrated pilot system demonstrated.
Task Switching Module	TRL 5	Laboratory testing of integrated system.

3.3 Method

This section includes an overview of the evaluation methodology used during the field trials of PEARL. To ensure a similar evaluation procedure at all test sites of PEARL, a systematic evaluation protocol was developed. This protocol gives a detailed description of the steps that were conducted during the trial. A more detailed description of the evaluation protocol used in the Netherlands, Switzerland and Romania/Greece can be found in chapter 3.2.4 General procedure and the full field trial protocol is given in Deliverable D2.4.2.

3.3.1 Study design

The study design used for the field trials of PEARL is a prospective cohort study with a pre- and post-test, which was conducted at three test sites: NL (Roessingh Research and Development), CH (COMARG) and RO/GR (SingularLogic). The study design is represented in Figure 3, whereby the use of the PEARL platform refers to the use of the different modules of PEARL.

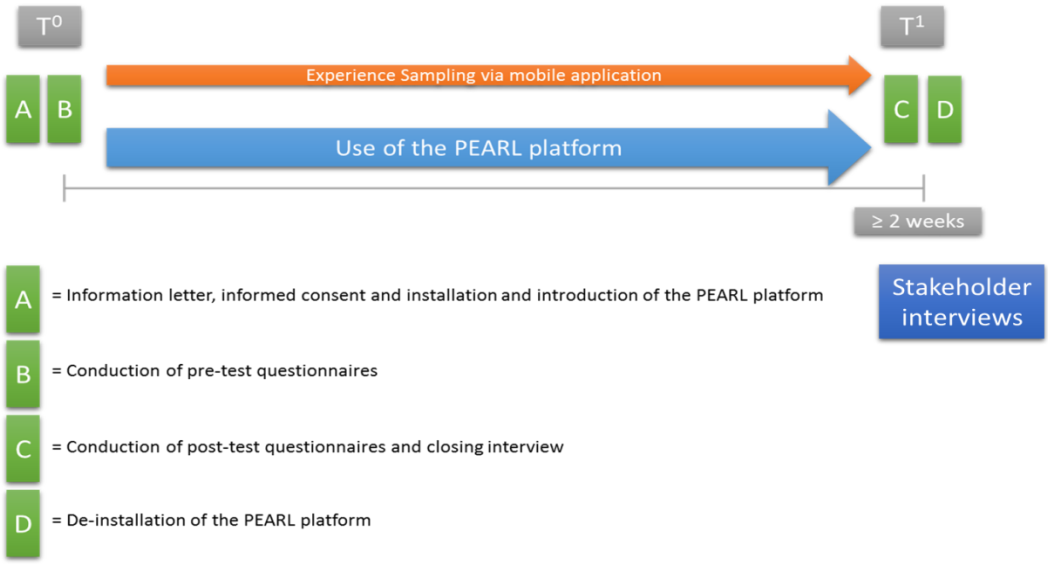


Figure 3. A schematic representation of the study design used during the field trials of PEARL

3.3.2 Participants

The participants in the Netherlands, Switzerland and Romania were recruited based on the following inclusion and exclusion criteria:

Inclusion criteria

- Age ≥ 50 years old;
- Office worker (using a computer for their work, at least 50% of their working time).

Exclusion criteria

- Physical impairments that do not allow effective use of the prototype (e.g. blindness and paralysis of the lower limb);
- Not signing the informed consent.

The participants for the field trials were recruited from various (external) organizations. For this evaluation, they received an invitation via e-mail. This provided the invitee the opportunity to read the information at his/her own pace and to ask the researcher for additional information, if necessary. Based on this information the invitee could make an informed decision whether or not to participate in the evaluation. Additionally, the consent form could be signed until just before the start of the evaluation, since the evaluation could not start without a signature of the potential participant. A format for the information letter and informed consent was created, which was translated by each test site. The combined document representing the information letter and informed consent form can be found in Appendix A.

3.3.3 Materials used during the evaluation

Each test site will evaluate the PEARL modules and install the PEARL software and hardware relevant for these modules. The general setup of PEARL is shown in Figure 4. A detailed description of the equipment for the whole PEARL set-up used can be found in Appendix C.

In general the dedicated PEARL hardware materials are:

- Second screen (touch based)
- Ambient light – Task Switching Module
- Availability indicator – Task Switching Module
- RFID-card (1 to login)
- RFID-reader
- Calendula (NL and CH) – Task and Time Management Module
- Activity sensor & smartphone – Physical Wellbeing Module

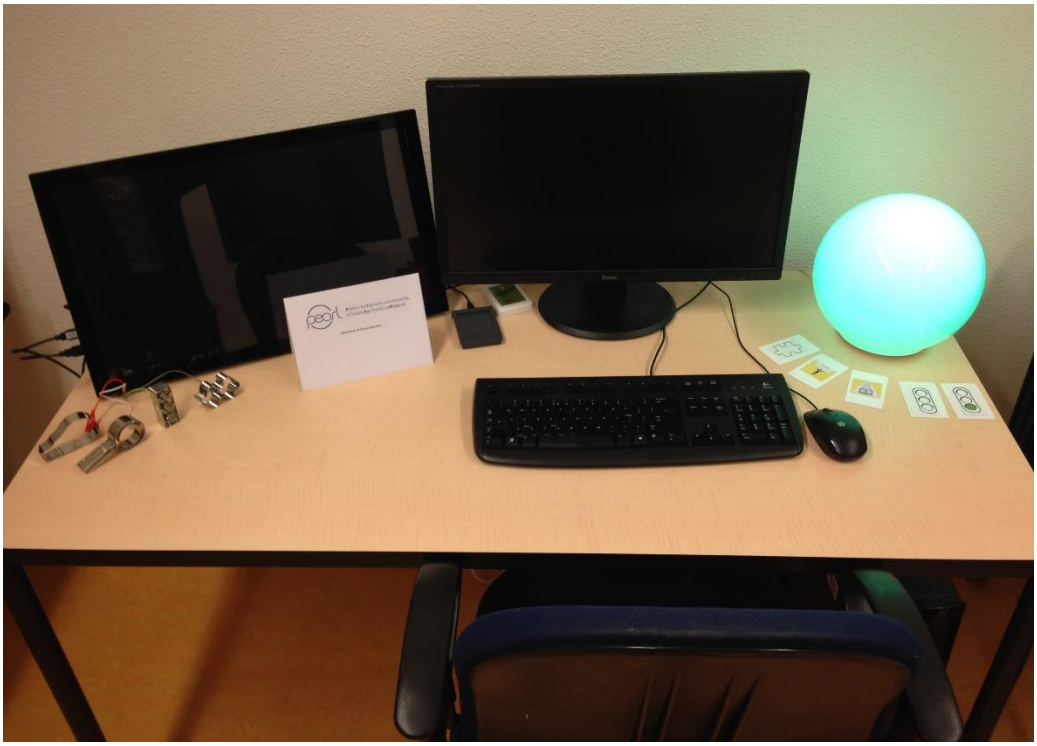


Figure 4. Technological setup for the field trials of PEARL, consisting a desktop PC, a second screen (touch based), a keyboard, a mouse, a RFID-reader, a RFID-card (to login), an availability indicator, an ambient light, and a digital-analogue calendar.

3.3.4 General procedure

The general trial procedure per participant is provided below. There were two contact moments in which the trial leader had intensive contact with the participant, namely the 'start moment' and the 'end moment'.

- The **Start moment (T_0)** consisted of step numbers 1 – 11 of the list below and took in total up to max. 90 minutes.
- The **End moment (T_1)** consisted of step numbers 12 – 13 of the list below and took in total up to max. 60 minutes of time of the participant.

0. Potential participants were recruited

<participant was willing to participate>

1. Welcome + questions of the participant were answered
2. The participant was asked to sign the informed consent form
3. The participant was introduced to PEARL (objectives)
4. It was explained what the end-user should do (= test protocol)

<agreement to start>

5. Installation of PEARL
6. Participant ID for the questionnaires was created
7. The start questionnaires were conducted

<final preparations for PEARL usage>

8. It was explained (again) what the end-user should do
9. The new user was created on the PEARL dashboard
10. The PEARL platform was shown
11. In case of questions the PEARL trial partner of the country was contacted.

<PEARL usage for 2 weeks>

12. The end questionnaires were conducted
13. The closing interview was conducted (by notes and voice recorder).

The participants were asked to use the PEARL platform for a period of 2 weeks. During the 2 weeks of use, participants had the possibility to use all PEARL modules (Figure 5).

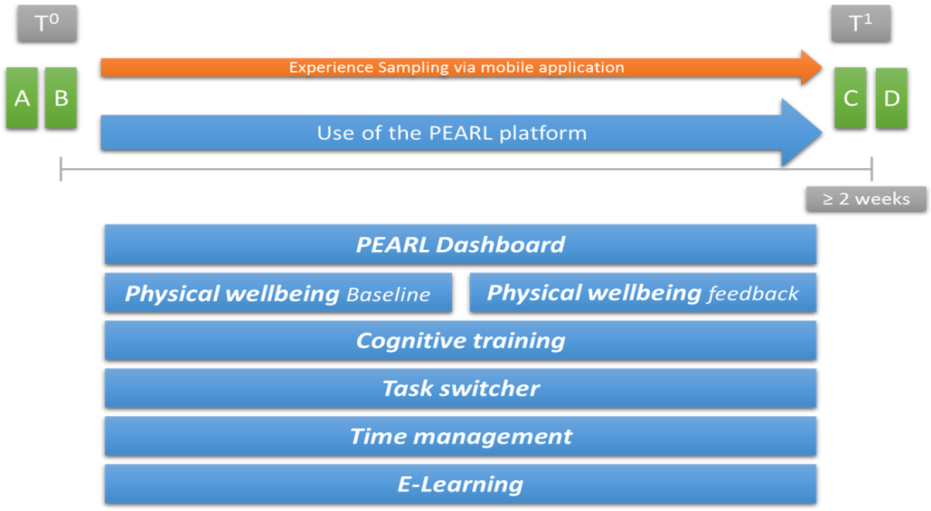


Figure 5. Schematic representation of the evaluation design as used during the PEARL field trials.

3.4 Data gathering

3.4.1 Study parameters

Table 3 provides an overview of the main study parameters, the tools to assess the study parameters and the timing of the measurement.

Table 3. An overview of the main study parameters, assessment tools and timing of the measurements for the PEARL field trials.

Study parameter	Assessment tool	Timing[1]		
		Pre-test	Use[2]	Post-test
User experience	RRD User Experience survey			✓
	ESM		✓	
Usability	System Usability Scale			✓
	uMARS			✓
Use	ESM		✓	
Potential effect 1. Increased worker productivity	Absenteeism and presentism	✓		✓
2. Increased level of confidence of employees	Occupational Self-efficacy scale	✓		✓
3. Increased level of satisfaction with the job as a whole and the work conditions	Job Satisfaction scale	✓		✓
Perceived usefulness	Interview (Appendix D)			✓
Intention to use	RRD User Experience survey			✓
Socio-economic outcomes[3]	Service user impact survey			✓
	Willingness-to-pay survey			✓
	Time-use survey			✓

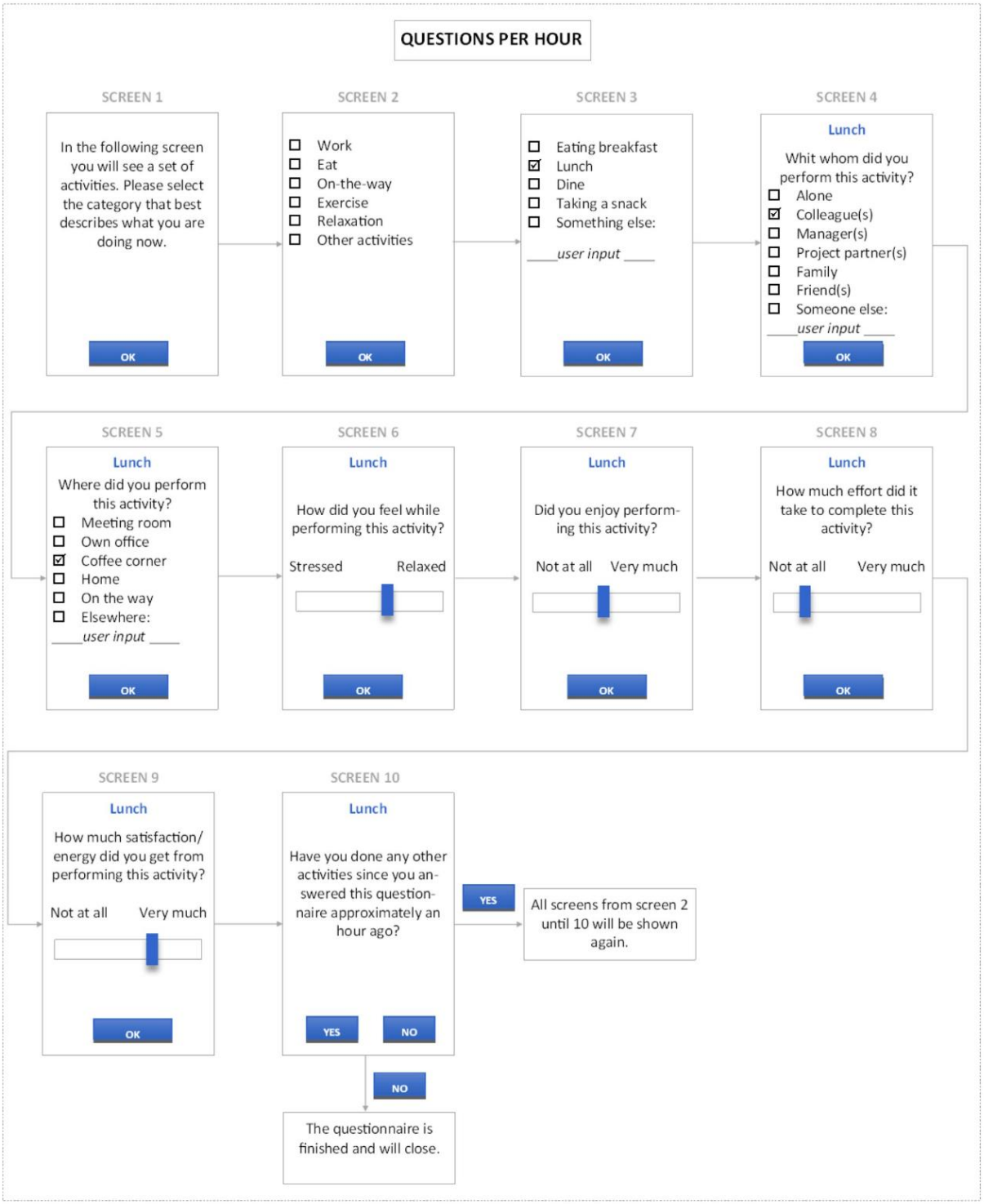
[1] Timing of these measurements is graphically explained in Figure 5.
[2] Testing phase = between pre- and post-test

[3] The socio-economic outcomes are part of the other stakeholder evaluation, which is explained in more detail, including methodology and results, in chapter 4 Other stakeholder evaluation.

Tools to assess the study parameters:

- ESM Experience Sampling Method (ESM) in combination with the movement sensor – To obtain more information about the work patterns of the participants and specifically which activities energize and on the other hand demotivate them, we asked them questions about:
  1. The activities they performed,
  2. with whom,
  3. and where they performed the activities,
  4. how they felt while performing the activities;
  5. whether they enjoyed performing the activities;
  6. how much effort it took to perform the activities and;
  7. how much energy/satisfaction they obtained from performing the activity.

  We asked the participants of the field trials to fill in this short digital questionnaire every hour for one working week (Monday – Friday) between 7am and 8pm. The questionnaire is prompted via an application on the smartphone by means of a vibration and a short sound. Figure 6 depicts the ESM questions in a flow chart as asked during the field trials. Furthermore, a movement sensor (Promove 3D) was worn on the hip of the participant to register their physical activity during the trials and to study the compliance with the activity suggestions.
- SUS System Usability Scale (Jordan, Thomas, McClelland, & Weerdmeester, 1996)
- uMARS (Stoyanov, Hides, Kavanagh, & Wilson, 2016) to assess the quality of the Physical Wellbeing smartphone application
- RRD User Experience survey (Rauschenberger et al., 2013)
- Absenteeism and presentism questions of the World Health Organization's Heath and Work Performance Questionnaire (HPQ) (Kessler et al., 2003)
- Occupational Self-efficacy scale (Rigotti, Schyns, & Mohr, 2008)
- Job Satisfaction scale (Morris & Venkatesh, 2010)
- Service User Impact Survey- Older Employees (SUIS)


QUESTIONS PER HOUR
SCREEN 1
In the following screen you will see a set of activities. Please select the category that best describes what you are doing now.
OK
SCREEN 2
Work
Eat
On-the-way
Exercise
Relaxation
Other activities
OK
SCREEN 3
Eating breakfast
Lunch
Dine
Taking a snack
Something else:
____user input ____
OK
SCREEN 4
Lunch
Whit whom did you perform this activity?
Alone
Colleague(s)
Manager(s)
Project partner(s)
Family
Friend(s)
Someone else:
____user input ____
OK
SCREEN 5
Lunch
Where did you perform this activity?
Meeting room
Own office
Coffee corner
Home
On the way
Elsewhere:
____user input ____
OK
SCREEN 6
Lunch
How did you feel while performing this activity?
Stressed
Relaxed
OK
SCREEN 7
Lunch
Did you enjoy performing this activity?
Not at all
Very much
OK
SCREEN 8
Lunch
How much effort did it take to complete this activity?
Not at all
Very much
OK
SCREEN 9
Lunch
How much satisfaction/ energy did you get from performing this activity?
Not at all
Very much
OK
SCREEN 10
Lunch
Have you done any other activities since you answered this questionnaire approximately an hour ago?
YES
NO
YES
All screens from screen 2 until 10 will be shown again.
NO
The questionnaire is finished and will close.

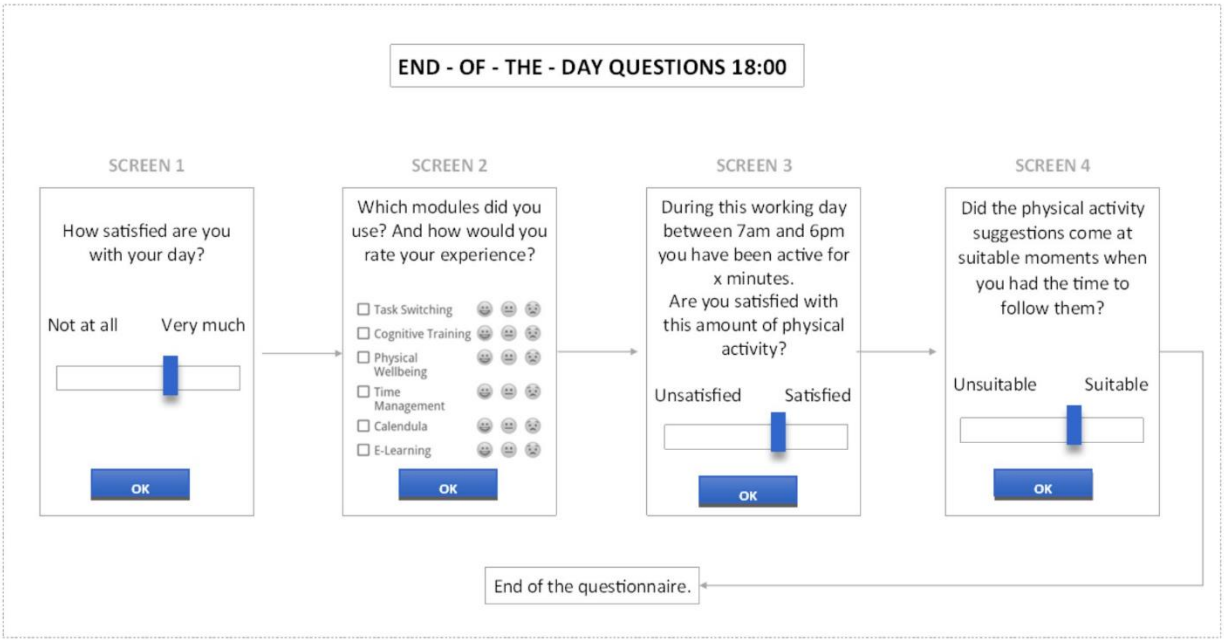


Figure 6. Flow chart of the ESM questionnaire as used during the field trials of PEARL

3.5 Analysis approaches

3.5.1 Pre-test

3.5.1.1 Questionnaires

During the pre-test, three questionnaires were conducted Table 3: 1. the Job Satisfaction scale, 2. the Occupational Self-efficacy scale, 3. the Absenteeism and Presentism questions of the World Health Organization's Health and Work Performance questionnaire (HPQ). These questionnaires were conducted in ReQuest (online questionnaire rool developed by RRD). Request provided the data (answers to the questions) in clearly structured tables in Excel. This data was uploaded and analysed by means of SPSS. With regard to the job satisfaction scale and the Occupational Self-efficacy scale this resulted in descriptive statistics (mean, standard deviation, and mode) for the overall scores on each questionnaire. The Absenteeism and Presentism questions of the World Health Organization's Health and Work Performance questionnaire (HPQ) are analysed per item, since the questionnaire also contains open-ended questions.

3.5.2 Use of the PEARL platform

3.5.2.1 The ESM questionnaire and movement sensor

The assessment of the data obtained from the ESM questionnaire was done by means of two methods:

1. The responses of the participants to the question what activities they performed in the previous hour. These answers were divided in activity categories and analysed by means of Excel on frequency bases provided in percentages.
2. The responses regarding the subjective questions (*their feelings with regard to the performed activities: stress, fun, effort, satisfaction and energy*) linked to each performed activity and the end of the day questions (*daily satisfaction level and the rating of the PEARL modules*) with the continuous response scales were analysed in Excel resulting in descriptive statistics (i.e. means, standard deviations, range, etc.).

In addition, the physical activity data was assessed by the use of the Integral of the Modulus of the Accelerometer output (IMA) from the Promove 3D movement sensor. The accelerations from the Promove 3D accelerometer were measured in counts per minute (10^{-3} $m/s^{2,}$). The amount of physical active minutes was used as unit of measurement. To distinguish physical activity from physical inactivity, a cut-off point of 823 counts per minute was used. The physical active minutes prior to and after a physical activity suggestion were analysed, with an analysed time period of 0-10 minutes before and after a physical activity suggestion was provided. Descriptive statistics were used for the intervention messages, response to messages, and actual physical activity.

3.5.3 Post-test

3.5.3.1 Questionnaires

As mentioned in paragraph 3.4.2.1., the following questionnaires were both conducted during the pre- and post-test: 1. the Job Satisfaction scale, 2. the Occupational Self-efficacy scale, 3. the Absenteeism and Presentism questions of the World Health Organization's Health and Work Performance questionnaire (HPQ). These questionnaires were analysed in the same way as in the pre-test.

In addition, four other questionnaires were conducted during the post-test, namely: 1. User Experience Survey, 2. System Usability Scale (SUS), 3. uMARS, 4. Service User Impact Survey and Willingness-To-Pay Survey. These questionnaires were also conducted in ReQuest. The analysis of these questionnaires are described in the following sub-paragraphs.

3.5.3.1.1 User Experience Survey

With regard to this questionnaire, all items in the first category were scored in a different way (1st item (1. Enjoyable – 7. Disgusting), 2nd item (1. Exciting – 7. Dull), 3rd item (1. Pleasant – 7. Unpleasant), 4th item (1. Interesting – 7. Boring). The scores on the remaining items of the User Experience Survey were set between 1. Strongly disagree till 5. Strongly agree. The data was again uploaded and analysed by means of SPSS. After this, descriptive statistics (mean, standard deviation, minimum, maximum) were calculated for each separate item and for each category (Rauschenberger et al., 2013). Since the items in the first category are all scored in a different way, these items were only separately analysed.

3.5.3.1.2 System Usability Scale (SUS)

The System Usability Scale provides a single number representing a composite measure of the overall usability of the module being studied, ranging from 0 to 100. The SUS score is calculated by means of the sum of the score contributions from each item. The score contribution per item ranges from 0 to 4:

- For items: 1, 3, 5, 7 and 9, the score contribution is the scale position minus 1.
- For items: 2, 4, 6, 8 and 10, the contribution is 5 minus the scale position.

After the score contributions per item are summed, this number must be multiplied by 2.5 to obtain the overall system usability score (Jordan e.a., 1996). Figure 7 categorized the SUS-scores in levels of acceptability (not acceptable – acceptable) and usability (worst imaginable – best imaginable).

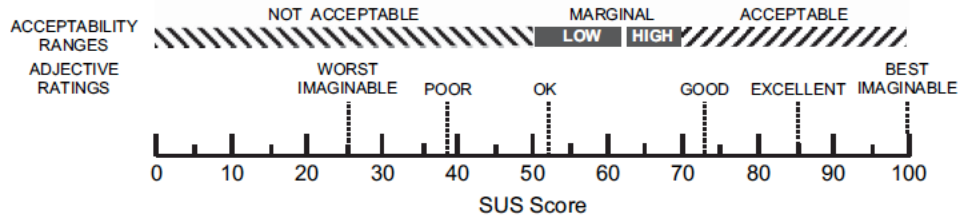


Figure 7 The SUS-Scores categorized in levels of acceptability and usability (Jordan e.a., 1996).

3.5.3.1.3 uMARS

The items in the questionnaire are clustered within 6 different categories: the engagement, functionality, aesthetics, information quality, subjective quality, and perceived impact (Stoyanov et al., 2016).

The data was analyzed by means of SPSS. The objective categories (the engagement, functionality, aesthetics, and information quality) were scored with a 5-point scale (0. Not applicable, 1. Inadequate, 2. Poor, 3. Acceptable, 4. Good, 5. Excellent). Descriptive statistics (mean, standard deviation, minimum, and maximum) were used to

present to scores of the objective categories. The perceived impact category is separately analyzed, because these items have a different response scale (1. Strongly Disagree till 5. Strongly Agree). In addition, the items of the subjective quality category were analyzed per item, since each question was scored with a different response scale (First question (1. Not at all - 5. Definitely), Second question (1. None - 5. >50), Third question (1. Definitely not - 5. Definitely yes), Fourth question (1. * - 5. *****). For both the perceived impact category and the subjective quality category the same descriptive statistics are provided as in the analyses of the objective categories.

3.5.3.2 Interviews

In order to generate useful conclusions out of the responses of the participants to the general and module specific questions, the question analysis approach was applied (Patton, 2014). This approach focuses on the participant's responses to all questions (general and module specific) posed by the researcher during the evaluation. This resulted in:

- a frequency table for the answers to each closed question (e.g. "Do you think that this PEARL module could be of added value to you?")
- a list of recommendations categorized per PEARL module and;
- a short summary including the first impression of the participants regarding the overall PEARL platform, the added value of the platform and whether they have the intention to use PEARL based on what they have seen during the evaluation.

3.6 Results

3.6.1 The collected data per trial partner

With regard to the interpretation of the results of the fields it is important to keep in mind that the data conducted during the PEARL field trials was not equally divided per test site. Table 3 provides an overview of the assessment tools that should have been applied during the trials, as described in the field trial protocol (D2.4.2), and the assessment tools that have actually been applied per test site.

Table 4 An overview including the assessment tools that should have been applied during the field trials of PEARL and how it has actually been conducted per test site (NL, CH and RO/GR).

✓ = Conducted

± = Partially conducted

× = Not conducted

* only conducted on platform level and not for each separate PEARL module.

Assessment tool	Protocol (n=15)			NL(n=15)			CH(n=9)			RO/GR(n=15)		
	Pre-test	Use	Post-test	Pre-test	Use	Post-test	Pre-test	Use	Post-test	Pre-test	Use	Post-test
RRD User Experience survey			✓			✓			×			✓
ESM		✓			✓			×			✓	
System Usability Scale			✓			✓			±			✓*
uMARS			✓			✓			×			✓
Absenteeism and presentism	✓		✓	✓		✓	×		✓	×		✓
Occupational Self-efficacy scale	✓		✓	✓		✓	×		✓	×		✓
Job Satisfaction scale	✓		✓	✓		✓	×		×	×		✓
Interview (Appendix D)			✓			✓			±			✓
Service user impact survey			✓			✓			×			✓
Willingness-to-pay survey			✓			✓			×			✓
Time-use survey			✓			✓			×			✓

Figure 8 The PEARL setup at one of the participants desk in the Netherlands.

3.6.2 Participants

3.6.2.1 Characteristics

The research sample of SiLO was composed slightly different, because SiLO could only find a few Romanian participants that comply with the inclusion criteria (n=5). Therefore they recruited the remaining ten participants via the Greek concern of SiLO. In addition, it is of added value to incorporate a wide range of cultures into the research sample, because the intention of the PEARL platform is to be usable and of added value for office employees (aged 55+) with a wide variety in their cultural background.

When combining all three research samples (NL, CH, and RO/GR), it showed that 29 participants were male. The mean age of the participants was ± 60 years old. When looking at the profession, there was a wide variety between the participants. They were combined into 9 categories, which can be found in combination with the rest of the sample characteristics in Table 5.

With regard to the results that are obtained during these field trials it is important to keep in mind that the results of the Dutch and Romanian/Greece participants have more weight, since in Swiss 9 participants participated in the field trials compared to 15 participants in the Netherlands and 15 in Romania/Greece.

Table 5 Characteristics of the three research samples of the PEARL field trials

Sample characteristics	NL	CH	RO/GR	Overall
Age (years)				
Mean	58.93	58.11	60.40	**59.15**
SD	5.39	4.46	7.72	**5.86**
Gender (n)				
Male	8	9	12	**29**
Female	7	0	3	**10**
Profession (n)				
Administration	4	2	0	**6**
(Project) Management	2	3	7	**12**
Health Care	1	0	0	**1**
Technician	3	1	0	**4**
Research	1	0	0	**1**
Teacher/professor	4	1	0	**5**
Developer	0	0	6	**6**
Designer	0	0	2	**2**
Other	0	2	0	**2**

3.6.3 Pre-test

3.6.3.1 Questionnaires

The questionnaires provided more insight in the current working situation and working context of the participants, which is valuable information for the development of the PEARL platform. A remark in this case is that the absenteeism and presentism questions of the World Health Organization's Health and Work Performance Questionnaire (HPQ), the Occupational Self-efficacy scale and the Job Satisfaction scale are only conducted by the RRD during the pre-test. Table 6 to Table 8 summarize the responses of the participants to the questionnaires.

Table 6. The result of the Occupational Self Efficacy Scale (OSES) conducted by RRD during pre-test of the PEARL field trials (n=15 Dutch participants).

	Mean	Mode	SD
Occupational Self Efficacy[1]	5.23	5	.57

[1] Response scale: 1. Not true at all – 6. Completely true.

Table 7. The result of the Job Satisfaction Scale conducted by RRD during the pre-test of the PEARL field trials (n=15 Dutch participants).

	Mean	Mode	SD
Job Satisfaction[2]	5.07	4	0.75

[2] Response scale: 1. Strongly Disagree – 7. Strongly Agree

Table 8. The results of the absenteeism and presentism questions of the World Health Organization's Heath and Work Performance Questionnaire (HPQ) conducted by RRD during the pre-test of the PEARL field trials (n=15 Dutch participants).

Item	Min.	Max.	Mean SD	
1. About how many hours altogether did you work in the past 7 days?	2.00	45.00	27.40	10.60
2. How many hours does your employer expect you to work in a typical 7-day week?	16.00	40.00	30.67	7.21
3. In the past 4 weeks (28 days), how many days did you miss an entire workday because of problems with your physical or mental health?	0.00	3.00	0.20	0.78
4. In the past 4 weeks (28 days), how many days did you miss an entire workday for any other reason (including vacation)?	0.00	14.00	4.53	4.98
5. In the past 4 weeks (28 days), how many days did you miss part of a workday because of problems with your physical or mental health?	0.00	4.00	0.47	1.25
6. In the past 4 weeks (28 days), how many days did you miss part of a workday for any other reason (including vacation)?	0.00	14.00	1.67	3.60
7. In the past 4 weeks (28 days), how many days did you come in early, go home late, or work on your day off?	0.00	20.00	4.40	5.63
8. About how many hours altogether did you work in the past 4 weeks (28 days)?	29.00	180.00	95.67	45.21
9. How would you rate the usual performance of most workers in a job similar to yours?[3]	5	8	7.27	1.10
10. How would you rate your usual job performance over the past year or two? [3]	7	10	8.00	0.76
11. How would you rate your overall job performance on the days you worked during the past 4 weeks (28 days)? [3]	5	10	7.87	1.13

[3] Response scale: 0 – 10: where 0 is the worst job performance anyone could have at a job and 10 is the performance of a top worker.

3.6.4 Use of the PEARL platform

3.6.4.1 The results of the ESM questionnaire

During the use of the PEARL platform, the participants were also asked to complete the ESM questionnaire, via the provided smartphone, approximately every hour during the workday (07:00 – 20:00). In addition, a few questions were asked at the end of the day regarding their daily level of satisfaction and to rate the PEARL modules they used that day. A flow chart of the actual ESM questions including a short description of the usage-procedure is provided in chapter 3.4.1 Study parameters - Figure 6. The (descriptive) results of this ESM questionnaire are divided in two levels:

1. Hourly level
    a. Activities, reported approximately every hour during the workday;
    b. Emotions, the corresponding feelings with regard to the reported activities;
2. Daily level
    a. Satisfaction, a score provided by the participant at the end of the day;
    b. Rating of the PEARL modules, a score per used PEARL module provided by the participant at the end of the day.

HOURLY LEVEL

Activities

A total overview of the reported activities divided per activity category in percentages is presented in Figure 9. It appears that ‘work’ is the activity category which is reported mostly by the participants (63%). In addition, participants were engaged in commuting (on the way) or eating activities in 11% of the reported cases. In 7% of the cases the reported activity did not fall into a specific category (Other activities). Finally, both relaxation and exercising activities were reported in 4% of all cases.

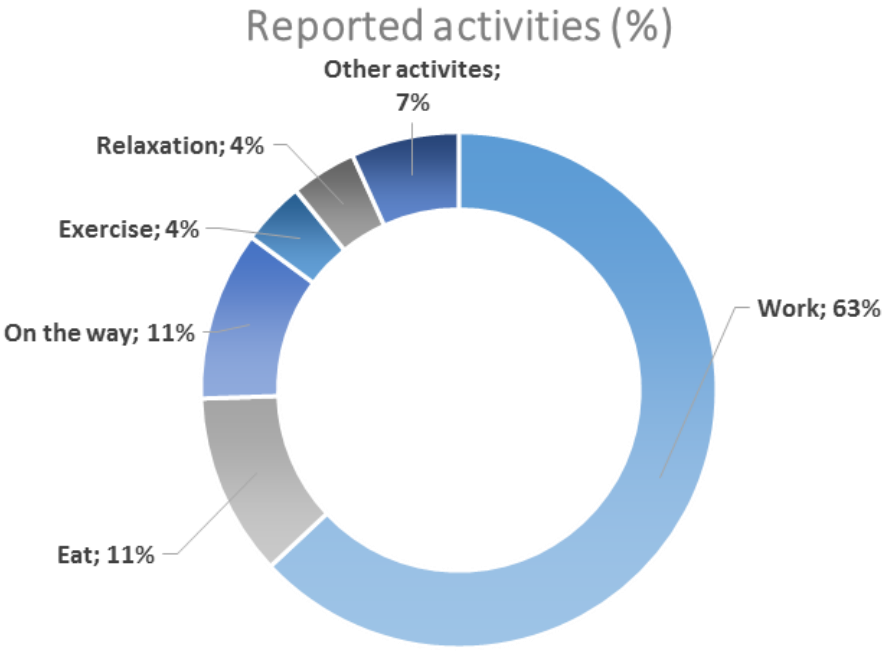


Figure 9 Total overview of the reported activities by the Dutch and Romanian/Greek participants during the PEARL field trials, a percentage provided per activity category.

Emotions

In Table 9 the descriptive statistics (mean, sd, min and max) are provided per continuous variable: stress, fun, effort, satisfaction and energy. These aspects were provided by the participant per reported activity. On average the reported stress, fun and level of satisfaction are rated with a 6. In addition, the required effort and obtained energy had lower mean scores, respectively 3.71 and 4.80. The minimum score for all variables reported by the participants was 0 and the max score 10.

Table 9 Descriptive statistics per continuous variable, asked in relation to each reported activity.

	Stress	Fun	Effort	Satisfaction	Energy
Mean	6.45	5.91	3.71	5.88	4.80
SD	1.86	1.93	2.03	1.99	2.64
Min	0.00	0.00	0.00	0.00	0.00
Max	10.00	10.00	10.00	10.00	10.00

DAILY LEVEL

Satisfaction

Figure 10 provides an overview of the daily levels of satisfaction reported by the participants. They rated their daily satisfaction on a scale from 0 (not at all) – 10 (very much). The overall mean score is 6.8 (SD=1.45), with a minimum score over 2.52 and a maximum score of 9.40.

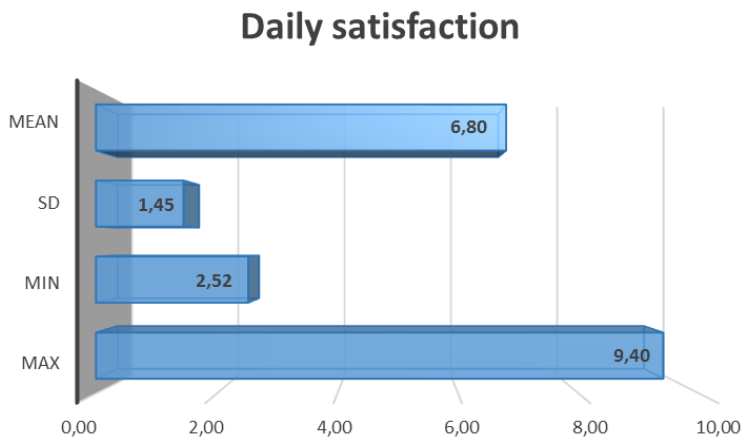


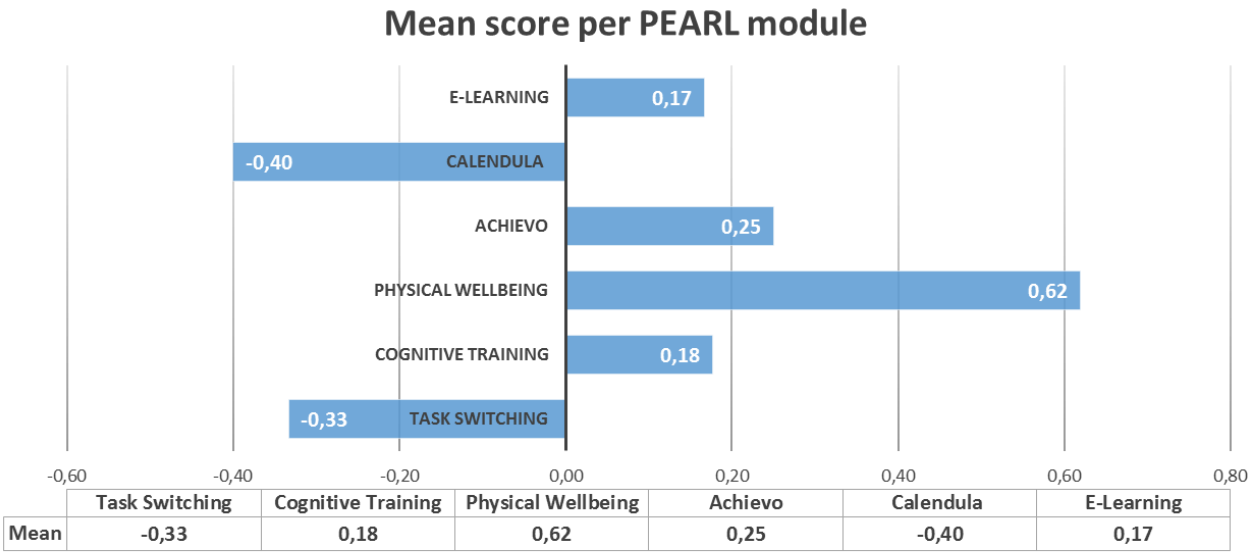
Figure 10 Daily level of satisfaction on a scale from 0 - 10, reported by the participants at the end of the working day (18:00)[2].

[2] Only one Romanian participants answered the daily satisfaction question for one day. The rest of the data is provided by the Dutch participants (n=15).

Rating of the PEARL modules

In Figure 11 an overview is provided of all mean scores with regard to the separate PEARL modules, which are rated on a daily basis by the participants. The response scale consisted of a 3-point likert scale including the following options: -1, 0 and 1.

The Calendula obtained the lowest mean score, namely -0.40 and the Physical Wellbeing module highest: 0.62. In addition, Achievo, the E-learning and Cognitive Training module all obtained a positive mean score, respectively 0.25, 0.17 and 0.18. However, the Task Switching module obtained a negative mean score, namely -0.33.



	Task Switching	Cognitive Training	Physical Wellbeing	Achievo	Calendula	E-Learning
Mean	-0,33	0,18	0,62	0,25	-0,40	0,17

Figure 11 An overview of the mean scores with regard to the personal experience with each PEARL module[3].

[3] Only one Romanian participant rated the PEARL modules for one day. The rest of the data is provided by the Dutch participants (n=15).

3.6.4.2 The physical activity data

Baseline + Intervention

The physical wellbeing module was used by 15 and 7 subjects in NL and GR/RO respectively and not by the CH subjects. The subjects wore the sensor in total for 148 days of which 124 consisted of at least 4 hours of wear-time, which were further analysed. The average wear-time on these days was 9.06 hours. The mean intensity per minute was 350 10^{-3} m/s^{-2} (SD 491) and median 126. And the mean intensity in the morning, afternoon and evening were respectively: 321, 337 and 504 10^{-3} m/s^{-2}. Minutes were classified as being sedentary when ≤ 823 10^{-3} m/s^{-2}. The subjects were 86.0% of the wear-time sedentary.

Intervention

Only 2 subjects of GR/RO and 15 subjects in NL used the physical wellbeing module during the second week and received an intervention message – to become active at that moment (see Figure 12). There were on average 4 intervention days per subject, and during an intervention day, they received on average 4.8 messages, see

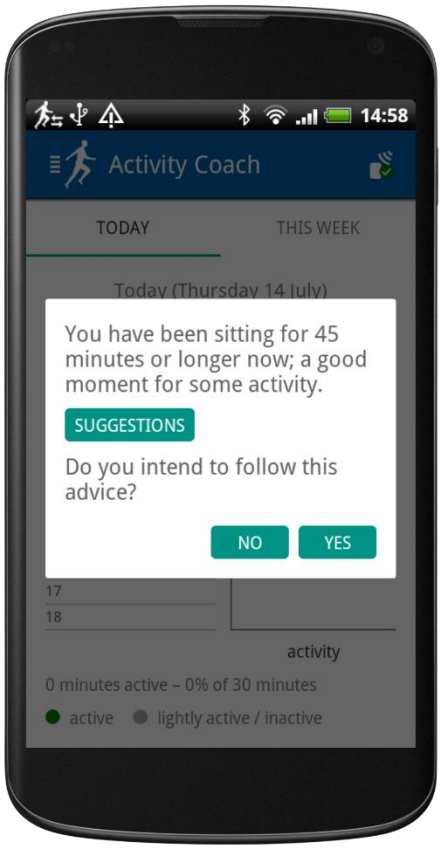


Figure 12 Physical Wellbeing Module: example of intervention message.

Table 10. Subjects answered 160 time YES to on the question the total 341 messages (57% of all intervention messages).

Subjects answered on average 9 times per day ‘YES’, and were on average 9 times physically active within the first 10 minutes after answering the intervention question. Compliance was calculated as the ratio between ‘YES’ and Active, resulting in an overall compliance of 101%. This is larger than 100% as some subjects indicated that the timing was not good ‘NO’, but nevertheless they were active in the first 10 minutes after giving this ‘NO’ answer.

Table 10 Physical Wellbeing Intervention. Number of messages encouraging the user to become more active to either reach 30 active minutes per day or to break a sitting bout of at least 45 minutes.

Subject	Total Intervention days [n]	Total Intervention message [n]	Answer 'YES' [n]	Active after intervention message [n]	Compliance % [ratio YES / Active]	Good timing % [% of YES]	Messages per day
RRD_NL_03_001	5	9	2	2	*100%*	*22%*	*1,8*
RRD_NL_03_002	5	37	12	14	*117%*	*32%*	*7,4*
RRD_NL_03_003	2	19	5	8	*160%*	*26%*	*9,5*
RRD_NL_03_004	3	15	4	7	*175%*	*27%*	*5,0*
RRD_NL_03_005	4	33	16	15	*94%*	*48%*	*8,3*
RRD_NL_03_006	3	10	10	6	*60%*	*100%*	*3,3*
RRD_NL_03_007	3	18	15	8	*53%*	*83%*	*6,0*
RRD_NL_03_008	16	65	0	29	-	*45%*	*4,1*
RRD_NL_03_009	3	18	13	7	*54%*	*72%*	*6,0*
RRD_NL_03_010	2	9	2	8	*400%*	*22%*	*4,5*
RRD_NL_03_011	5	13	9	9	*100%*	*69%*	*2,6*
RRD_NL_03_012	6	32	31	7	*23%*	*97%*	*5,3*
RRD_NL_03_013	3	9	7	3	*43%*	*78%*	*3,0*
RRD_NL_03_014	6	28	20	16	*80%*	*71%*	*4,7*
RRD_NL_03_015	4	20	12	7	*58%*	*60%*	*5,0*
GR_03_005	1	1	1	0	*0%*	*100%*	*1,0*
GR_03_010	1	5	1	1	*100%*	*20%*	*5,0*
Total (mean)	**4**	**20**	**9**	**9**	***101%***	***57%***	***4,8***

3.6.5 Post-test

3.6.5.1 Questionnaires

The results of the absenteeism and presentism questions of the World Health Organization's Health and Work Performance Questionnaire (HPQ), the Occupational Self-efficacy scale and the Job Satisfaction scale are displayed in Table 11 till Table 13. An important note when interpreting the results, is that these questionnaires are all conducted by RRD, but only partially conducted by the COMARG and SiLO. The exact number of responses per test site can be found in the caption of each table.

Table 11. The result of the Occupational Self Efficacy Scale (OSES) conducted during post-test of the PEARL field trials (n= 39, of which 15 Dutch, 15 Greek/Romanian and 9 Swiss participants).

	Mean	Mode	SD
Occupational Self Efficacy	5.03	5.00	0.56

[1] Response scale: 1. Not true at all – 6. Completely true.

Table 12. The result of the Job Satisfaction Scale conducted during the post-test of the PEARL field trials (n= 27, of which 15 Dutch & 12 Greek/Romanian participants).

	Mean	Mode	SD
Job Satisfaction	4.53	3	1.34

[2] Response scale: 1. Strongly Disagree – 7. Strongly Agree

Table 13. The results of the absenteeism and presentism questions of the World Health Organization's Heath and Work Performance Questionnaire (HPQ) conducted during the post-test of the PEARL field trials (n= 37, of which 15 Dutch & 13 Greek/Romanian and 9 Swiss participants)

Item	Min.	Max.	Mean	SD
1. About how many hours altogether did you work in the past 7 days?	8.00	52.00	37.82	10.82
2. How many hours does your employer expect you to work in a typical 7-day week?	16.00	42.00	36.35	6.76
3. In the past 4 weeks (28 days), how many days did you miss an entire workday because of problems with your physical or mental health?	0.00	6.00	0.51	1.17
4. In the past 4 weeks (28 days), how many days did you miss an entire workday for any other reason (including vacation)?	0.00	12.00	2.87	3.37
5. In the past 4 weeks (28 days), how many days did you miss part of a workday because of	0.00	4.00	0.32	0.78

	problems with your physical or mental health?				
6.	In the past 4 weeks (28 days), how many days did you miss part of a workday for any other reason (including vacation)?	0.00	8.00	1.00	1.97
7.	In the past 4 weeks (28 days), how many days did you come in early, go home late, or work on your day off?	0.00	24.00	4.54	5.82
8.	About how many hours altogether did you work in the past 4 weeks (28 days)?	0.00	180.00	110.55	57.48
9.	How would you rate the usual performance of most workers in a job similar to yours?[3]	4.00	10.00	7.62	1.12
10.	How would you rate your usual job performance over the past year or two? [3]	6.00	10.00	9.43	10.27
11.	How would you rate your overall job performance on the days you worked during the past 4 weeks (28 days)? [3]	6.00	9.00	7.86	0.82

[3] Response scale: 0 – 10: where 0 is the worst job performance anyone could have at a job and 10 is the performance of a top worker.

3.6.5.1.1 User Experience Survey

The responses of the participants in relation to the User Experience Survey are displayed in Table 14. A remark when interpreting the results of the User Experience survey is that this survey is only conducted by RRD and SiLO during the PEARL field trials. The exact number of responses per test site can be found in the caption of the table.

Table 14. The scores of the participants in relation to the User Experience Survey (n= 28, of which 14 Dutch & 14 Greek/Romanian participants).

	Min.	Max.	Mean	SD
Enjoyment				
1. PEARL was (1. Enjoyable – 7. Disgusting)	1.00	6.00	2.89	1.52
2. PEARL was (1. Exciting – 7. Dull)	1.00	6.00	3.54	1.55
3. PEARL was (1. Pleasant – 7. Unpleasant)	1.00	7.00	2.89	1.55
4. PEARL was (1. Interesting – 7. Boring)	1.00	6.00	2.93	1.70
Aesthetics	3.60	6.70	5.06	1.01
Control	1.67	7.00	5.48	1.27
Trust in technology	2.25	6.50	3.49	0.85
Perceived usefulness	1.00	6.17	3.53	1.43

Ease of Use	1.25	7.00	5.46	1.72
Intention to use	1.00	7.00	3.90	1.78

Since item 1 – 4 under the heading 'Enjoyment' have a different response scale from each other and from the rest of the questionnaire, all four items are separately shown.

[1] Item 1 is scaled from 1. Enjoyable – 7. Disgusting.

[2] Item 2 is scaled from 1. Exciting – 7. Dull.

[3] Item 3 is is scaled from 1. Pleasant – 7. Unpleasant.

[4] Item 4 is scaled from 1. Interesting – 7. Boring.

*The remaining items on the User Experience Survey are scaled from 1. Strongly Agree - 7. Strongly Disagree.

3.6.5.1.2 System Usability Scale

During the post-test the participants were asked to fill the System Usability Scale (SUS) (Jordan e.a., 1996) for each separate PEARL module. The separate SUS scores per module can be found in Figure 13 until Figure 18. A SUS-score above 68 is considered as above average and any score below 68 is below average. A remark when interpreting the results of the SUS scores is that only RRD and COMARG conducted the SUS on module level. SiLO conducted the SUS on platform level of which the result can be found in Table 14. The exact number of responses per test site can be found in the caption of each figure.

E-Learning & Skills Development module

Figure 13 shows the average system usability score with regard to the E-Learning & Skills Development module on the SUS-graph.

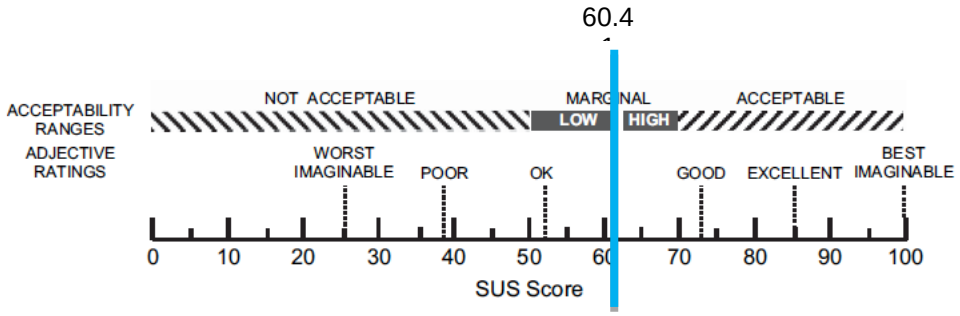


Figure 13. SUS-score graph, including the average system usability score of the E-Learning & Skills Development module (60.4) (n=23, of which 14 Dutch and 9 Swiss participants).

Physical Well-being module

Figure 14 shows the average system usability score with regard to the Physical Wellbeing module on the SUS-graph.

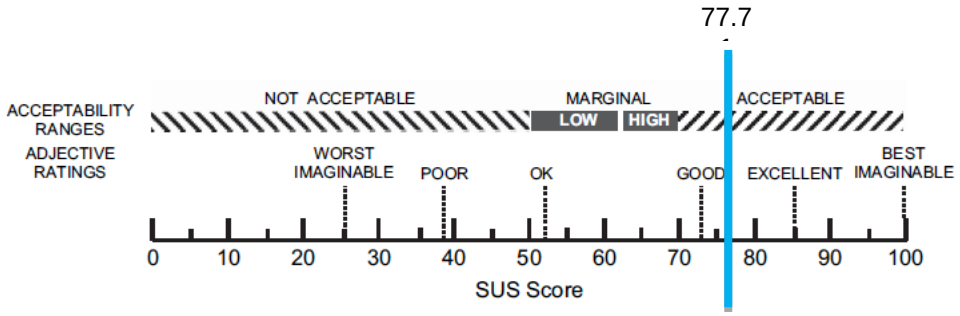


Figure 14. SUS-score graph, including the average system usability score of Physical Wellbeing module (77.7) (n=24, of which 15 Dutch and 9 Swiss participants).

Cognitive Training module

Figure 15 shows the average system usability score with regard to the Cognitive Training module on the SUS-graph.

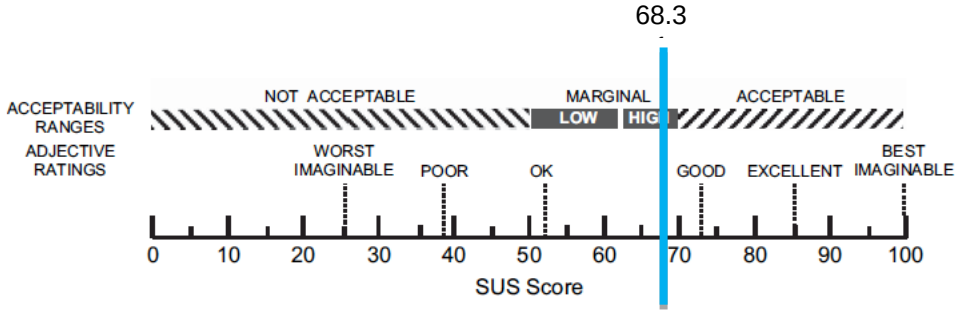


Figure 15. SUS-score graph, including the average system usability score of Cognitive Training module (68.3) (n=20, of which 11 Dutch and 9 Swiss participants).

Task & Time Management module

Figure 16 shows the average system usability score with regard to the Task & Time Management module on the SUS-graph.

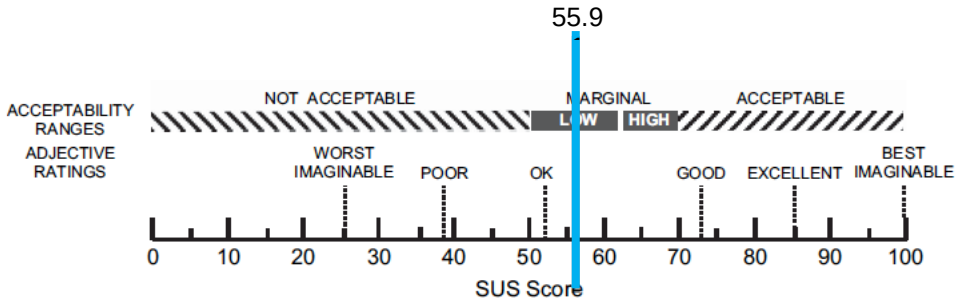


Figure 16. SUS-score graph, including the average system usability score of the Task & Time management module (55.9) (n=13 Dutch participants).

Task Switching module

Figure 17 shows the average system usability score with regard to the Task Switching module on the SUS-graph[1].

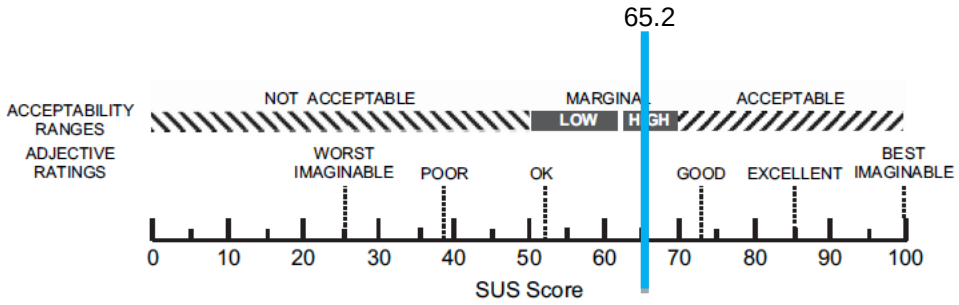


Figure 17 SUS-score graph, including the average system usability score of the Task Switching module (65.2) (n=13 Dutch participants).

[1]The SUS score with regard to the Task Switching module primarily reflects the usability of the lamps, because the responsible technical partner could nog accomplish a connection between the module and the lamps at the Dutch and Swiss test site.

The overall PEARL platform

As briefly mentioned before, the Greek and Romanian participants (SiLO) only completed the System Usability Scale (SUS) with regard to the whole PEARL platform. The results of this questionnaire with regard to the whole PEARL platform can be found in Figure 18.

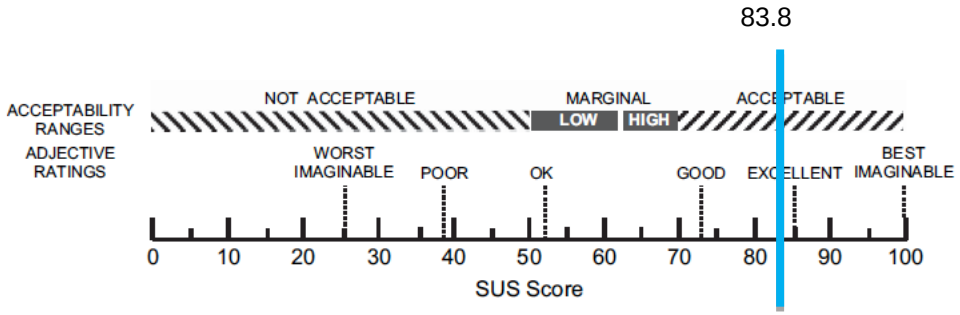


Figure 18. SUS-score graph, including the average system usability score of the overall PEARL platform (83.8) (n=15 Romanian/Greek participants).

3.6.5.1.3 uMARS

The responses of the participants to the uMARS questionnaire are displayed in Table 15. A remark when interpreting the results of the uMARS questionnaire is that this survey is only conducted by RRD and SiLO during the PEARL field trials. The exact number of responses per test site can be found in the caption of the table.

Table 15. The scores of the participants in relation to the uMARS questionnaire (n= 25, of which 14 Dutch & 11 Greek/Romanian participants).

Categories[1]	Min.	Max.	Mean	SD
Engagement	1.60	4.60	3.27	0.73
Functionality	2.75	5.00	4.04	0.62
Aesthetics	2.67	4.67	3.80	0.59
Information quality	1.33	5.00	3.64	0.82
Subjective quality				
1. Would you recommend this app to people who might benefit from it?[2]	1.00	5.00	3.52	1.09
2. How many times do you think you would use this app in the next 12 months if it was relevant to you?[3]	1.00	5.00	2.68	1.38
3. Would you pay for this app?[4]	1.00	4.00	2.48	1.23
4. What is your overall (star) rating of the app?[5]	1.00	5.00	3.44	1.00
Perceived impact[6]	1.00	4.83	3.33	0.92

[1] Each MARS item of the categories Engagement, Functionality, Aesthetics, and Information quality was scored with a 5-point scale (1. Inadequate, 2. Poor, 3. Acceptable, 4. Good., 5. Excellent). I fit appeared an item was not applicable, an option of not applicable was included.

[2] The first question oft he Subjective quality category was scored with: 1. Not at all, 2. A few people, 3. Maybe, 4. Many people, 5. Definitely.

[3] The second question oft he Subjective quality category was scored with: 1. No one, 2. 1-2, 3. 3-10, 4. 10-50, 5. >50.

[4] The third question oft he Subjective quality category was scored with: 1. Definitely not - 5. Definitely yes.

[5] The fourth question oft he Subjective quality category was scored with: 1. * - 5. *****.

[6] The Perceived impact category was scored with: 1. Strongly disagree – 5. Strongly agree.

3.6.5.2 Interviews

After the conduction of the above mentioned questionnaire, an interviews was conducted in which each PEARL module was shortly discussed. This interview aimed at obtaining information from the participants about their experiences with the modules, the added value and the potential effect of each module. In order to clearly structure the responses to all interview questions, they are presented in frequency tables, doughnut or bar charts[4].

3.6.5.2.1 E-Learning & Skills Development module

1. <u>Added value</u>

As shown in Table 16, most participants stated that the E-Learning & Skills Development module could be of added value to them (n=39, of which 15 Dutch, 15 Greek/Romanian participants and 9 Swiss participants). Of all participants, 64% stated that the E-Learning & Skills Development module could not support them in their work. In addition, the majority of the participants (62%) does not think that the module could help them relax during the workday. Oh the other hand, most participants (56%) say this module could help them to train their work skills.

Table 16 An overview of the frequencies and an explanation of the responses from the participants regarding the added value of the E-Learning & Skills Development module.

Question "Do you think this module could be of added value to you?"		
	Frequencies	**Explanation**
Yes	23	People mention it would be nice to get a quick lesson about different relevant topics in relation to their work.
No	16	People mention to add actual content, and also content which is relevant for their profession. Overall, the design of the module should be improved.

[4] When interpreting the results of the interviews it is important to keep in mind that COMARG only evaluated the e-learning module, the physical wellbeing module and the cognitive training module during the closing interview.

2. Module specific questions

Positive and negative aspects

As shown in Figure 19, it is notable that the participants valued the question and answer structure of the module, the video tutorials and stated that the user interface was clear and well structured. However, they stated that they missed relevant content, there was no clear navigation and a lot of features were unavailable (Figure 20).

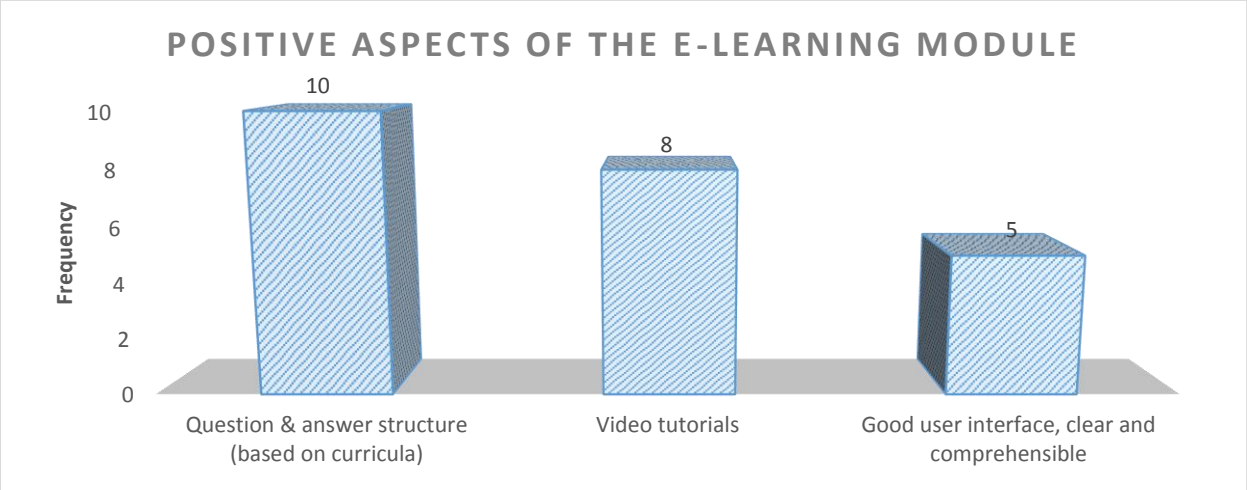


Figure 19 The top three of the most frequently mentioned positive aspects by the participants regarding the E-Learning & Skills Development module (n=25, of which 11 Dutch and 14 Greek/Romanian participants).

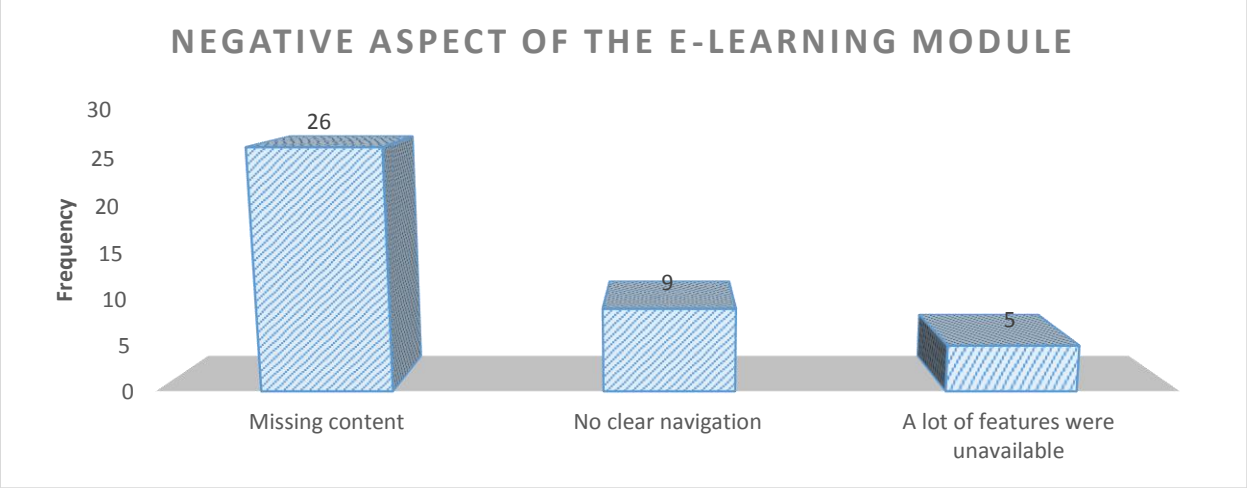


Figure 20 The top three of the most frequently mentioned negative aspects by the participants regarding the E-Learning & Skills Development module (n=28, of which 14 Dutch and 14 Greek/Romanian participants).

Develop personal skills

Most participants stated that this module could not help them in developing their personal skills.

Table 17 An overview of the frequencies and an explanation of the responses from the participants regarding the development of their personal skills by means of the E-Learning & Skills Development module (n=39, of which 15 Dutch, 15 Greek/Romanian and 9 Swiss participants).

Question "Do you think this module could help you to develop your personal skills?"		
	Frequencies	**Explanation (trend)**
Yes	17	People saw the module as a training to develop themselves more. However, this development depends strongly on the provided content in the module.
No	22	People want to see content so they could actually say something about this. Right now, they mention there are other important things they prefer to do instead of using this module.

Sharing knowledge

Most participants stated that this module could not help them to share their knowledge with other colleagues.

Table 18. An overview of the frequencies and an explanation of the responses from the participants regarding the sharing of knowledge by means the E-Learning & Skills Development module (n=39, of which 15 Dutch, 15 Greek/Romanian and 9 Swiss participants).

Question "Do you think this module could help you to share your skills with others?"		
	Frequencies	**Explanation (trend)**
Yes	11	It could be of additional value to share your skills with others, to make it possible to learn from each other. However, in order to be of added value the module should contain courses and information related to their specific work field.
No	28	People would not use the module to upload their own programs, because they already do it in their company in another way or because they are simply not the kind of person that likes to share these things. In addition, they have to use it more intense to actually say something about its added value.

3. Recommendations

The results of the interviews were used to define specific recommendations for the E-Learning & Skills Development module. They will be used for the further refinement of the module and can be found in Table 19.

Table 19 Recommendations for the E-Learning & Skills Development module resulting from the field trials.

Recommendations - E-Learning & Skills Development module
Add a search button to make it possible to find the things you like to perform in a quick way.
Add content to the lessons in the module.
Add content relevant to the profession of the user.
Add different learning units.
Improve the design of the module.
Make sure the content fits with what someone likes to do with the e-learning program during work.
Make sure the content includes more variation.
Improve the interface so it becomes clear what the four aspects on the home screen are. In addition, add content.
Make sure the title of the subjects covers the content of the subjects.
Improve the navigation in the module.
Resolve the technical problems.

3.6.5.2.2 Physical Wellbeing module

1. Added value

Most participants do believe that the Physical Wellbeing module could be of added value to them (n=39, of which 15 Dutch, 15 Greek/Romanian and 9 Swiss participants). Most participants (59%) stated that the Physical Wellbeing module could not support them in their work. Neither did most participants (79%) think that the module could help them to relax or to stay focused (67%) during the workday. However, the majority of the participants (67%) said that the module could help them to train their physical health.

Table 20 An overview of the frequencies and an explanation of the responses from the participants regarding the added value of the Physical Wellbeing module.

Question "Do you think this module could be of added value to you?"		
	Frequencies	**Explanation**
Yes	34	People think the module creates awareness regarding their movement pattern and helps them to become more physical active during the day.
No	5	Some people think the module is not of added value, because according to them they are already physically active enough during the day.

2. Module specific questions

Positive and negative aspects

As shown in Figure 21 it is notable that most participants stated that the module was easy to use, it creates awareness and provides good insight in their physical activity pattern. On the contrary, most participants stated that the sensor was too big for them, it was a burden to carry it around the whole day. In addition, most of the participants said that the physical activity suggestions did not always pop-up at convenient timings and the graphics of the App were not of high quality(Figure 22).

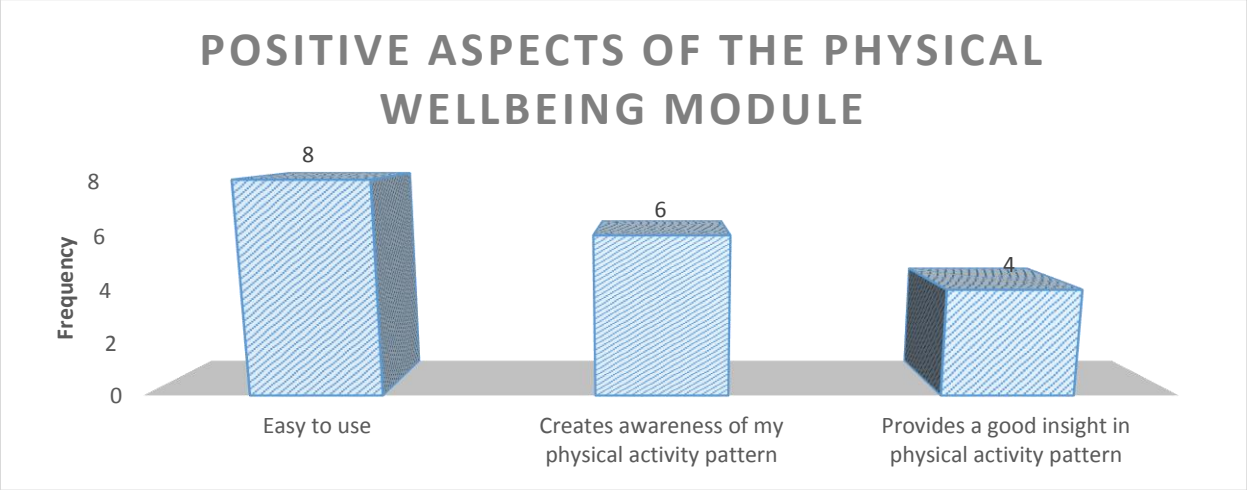


Figure 21 The top three of the most frequently mentioned positive aspects by the participants regarding the Physical Wellbeing module (n=28, of which 14 Dutch and 14 Greek/Romanian participants).

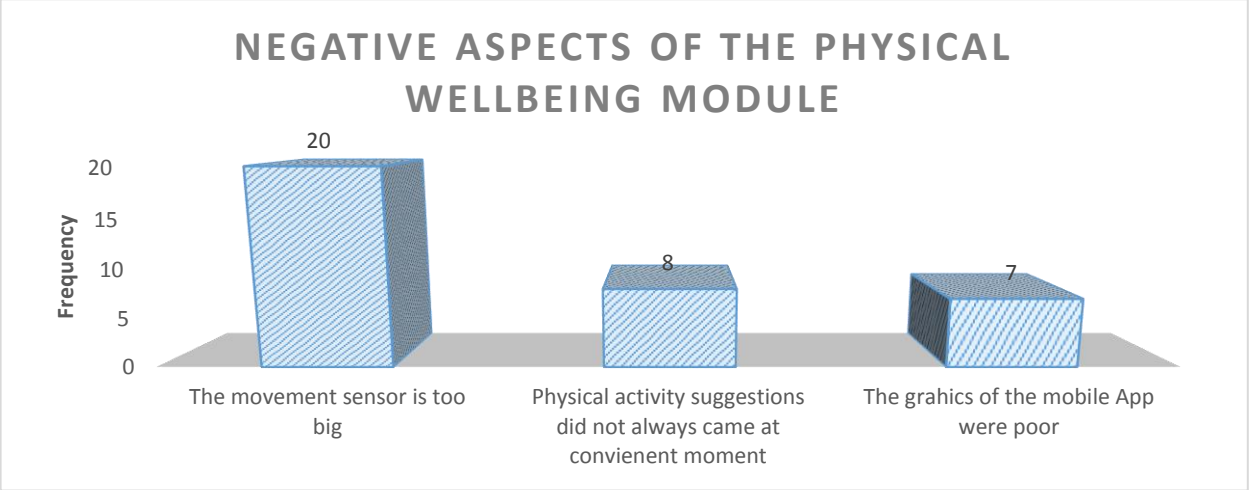


Figure 22 The top three of the most frequently mentioned negative aspects by the participants regarding the Physical Wellbeing module (n=29, of which 14 Dutch and 15 Greek/Romanian participants).

Physical activity suggestions

Most participants like the way in which the physical activity suggestions are provided. They stated them to be motivating.

Table 21 An overview of the frequencies and an explanation of the responses from the participants regarding the method of providing the physical activity suggestions (n=39, of which 15 Dutch, 15 Greek/Romanian and 9 Swiss participants).

Question "Is this (messages including physical activity suggestions) how you would like to be motivated to be more physically active during the workday?"		
	Frequencies	**Explanation**
Yes	30	People liked the suggestions and the way they were presented.
No	9	People would prefer to receive the suggestions on their own smart phone or on their computer screen.

The dedicated portal

Most participants were positive about the intuitiveness of the dedicated portal on which they can see their physical activity pattern.

Table 22 An overview of the frequencies and an explanation of the responses from the participants regarding the intuitiveness of the dedicated portal (n=39, of which 15 Dutch, 15 Greek/Romanian and 9 Swiss participants).

Question "Provides the portal an intuitive representation of physical activity per day/work week?"		
	Frequencies	**Explanation**
Yes	34	People thought the portal was useful and clear. It helped them to be more active during the day and to be more aware of their movement pattern during the workday.
No	5	Some people did not see the added value of the portal in relation to the smart phone. In addition, some did not use the portal and only used the smart phone.

3. Recommendations

The results of the interviews were used to define specific recommendations for the Physical Wellbeing module. They will be used for the further refinement of the module and can be found in Table 23.

Table 23 Recommendations for the Physical Wellbeing module resulting from the field trials.

Recommendations - Physical Wellbeing module
Extend the intervals of receiving suggestions, perhaps every 60-90 minutes. Furthermore, the smartphone is too slow.
Integrate the ESM questionnaire in the agenda.
Use the accelerometer of the smartphone.
Make sure it is clear that the suggestion button is a button you can press on.
Make sure the suggestions come at a convenient time.
Make the physical activity suggestions more motivating by mentioning some extra health facts, so people become aware of the importance of physical activity and the consequences when lacking physical activity.
Make sure the suggestions fit the activity pattern of the user.
Make it possible to see how much steps are taken on each day.

3.6.5.2.3 Cognitive Training module

1. Added value

Most participants stated that the Cognitive Training module could be of added value to them (n=39, of which 15 Dutch, 15 Greek/Romanian and 9 Swiss participants). However, most participants (79%) stated that the Cognitive Training module could not support them in their work nor could it help them to relax during the day (54%), to train their cognition (62%) or to stay focused during the day (77%).

Table 24 An overview of the frequencies and an explanation of the responses from the participants regarding the added value of the Cognitive Training module.

Question "Do you think this module could be of added value to you?"		
	Frequencies	**Explanation**
Yes	24	Receiving some other incentives than normal. Bugs in the module triggered to find more bugs. In terms of relaxation, the module could be of added value.
No	15	Do not like these games and do not like to play games during working hours. The translations were often not sufficient. In addition, the games did not always work.

2. Module specific questions

Positive and negative aspects

As shown in Figure 23, it is notable that most participants valued the games, the idea behind the module and to do some games for relaxation during working hours. On the contrary, the technical problems, simplistic graphics and the games themselves were seen as negative aspects of the module (Figure 24).

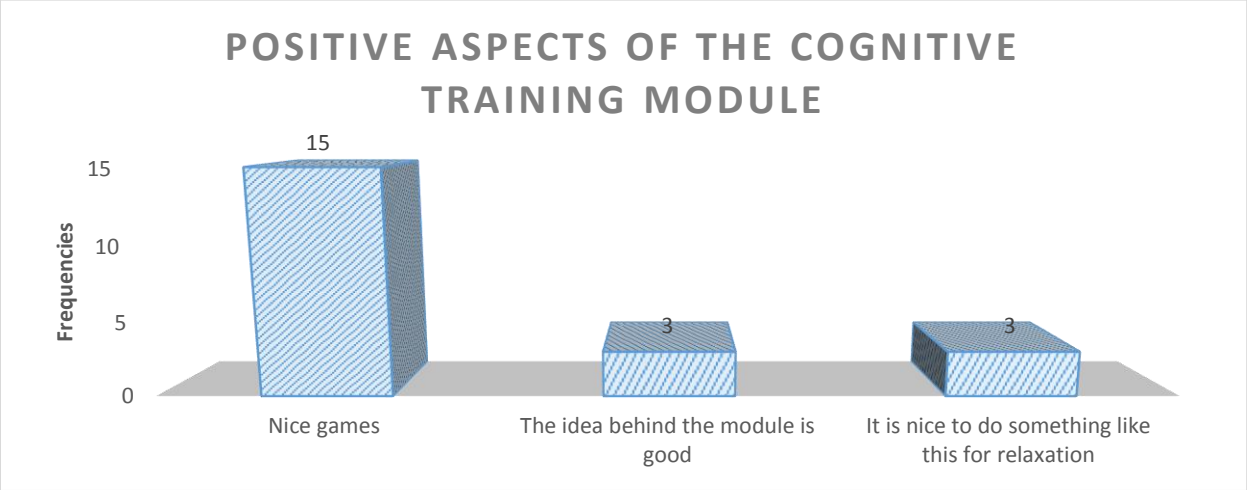


Figure 23 The top three of the most frequently mentioned positive aspects by the participants regarding the Cognitive Training module (n=27, of which 12 Dutch and 15 Greek/Romanian participants).

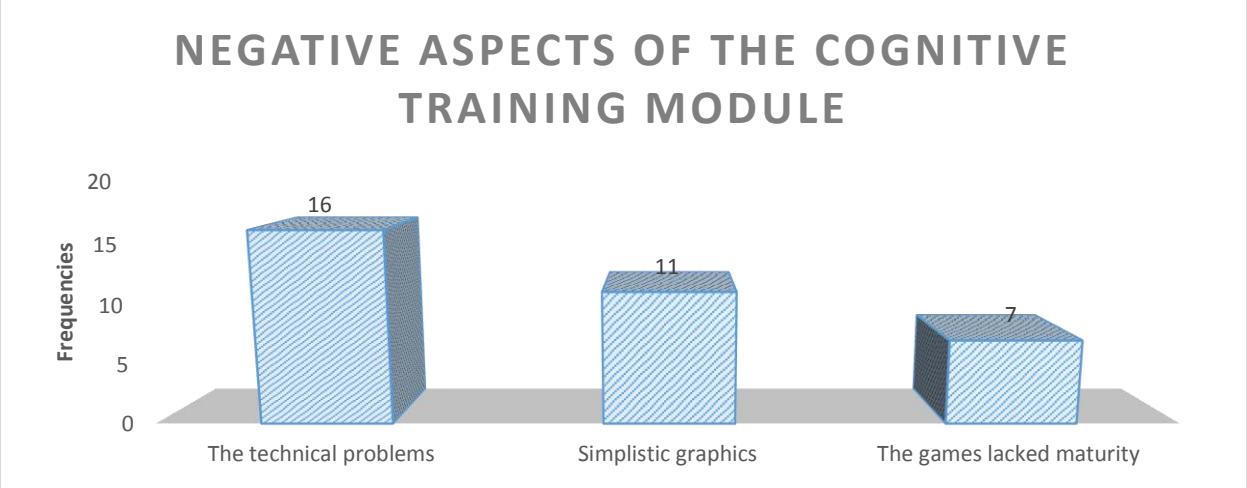


Figure 24 The top three of the most frequently mentioned negative aspects by the participants regarding the Cognitive Training module (n=26, of which 13 Dutch and 13 Greek/Romanian participants).

Cognitive games

As shown in Table 25 and Table 26, most participants stated they like to play the provided games to stimulate their cognition.

Table 25. An overview of the frequencies and an explanation of the responses from the participants regarding the relevance games themselves (1) (n=39, of which 15 Dutch, 15 Greek/Romanian and 9 Swiss participants).

Question "Are these the games you would like to play to stimulate your cognition?"		
	Frequencies	**Explanation**
Yes	27	A few participants think the games were fine and appealing, when considering the content and type of games.
No	12	The majority of the people do not like the games, due to the fact there are too many technical problems. Besides, the module is badly translated and not very mature. In general, people prefer to do other things to train their cognition.

Table 26 An overview of the frequencies and an explanation of the responses from the participants regarding the relevance of the games (2) (n=32, of which 15 Dutch, 8 Greek/Romanian and 9 Swiss participants).

Question "Would other games be more sufficient? If yes, which ones?"		
	Frequencies	**Explanation**
Yes	14	Most participants stated that other games, more intellectual games, will probably be more sufficient to train their cognition. The examples they mentioned: Crosswords, Sudoku, Angry Birds, Mahjon, Chess, Bridge.
No	18	The participant that stated that no other games would be more sufficient to train their cognition, also mentioned that they do not like to play games to train their cognition.

3. Recommendations

The results of the interviews were used to define specific recommendations for the Cognitive Training module. They will be used for the further refinement of the module and can be found in Table 25.

Table 27 Recommendations for the Cognitive Training module resulting from the field trials.

Recommendations - Cognitive Training module
Resolve the technical problems in the module.
Make sure the games are properly translated. Improve the quality of the games.
Make sure the whole module fully translated.
Resolve the technical problems in the module. Furthermore, answers that were correct were indicated as incorrect, this needs improvement. A suggestion would be to use existing games instead of new games that do not work as they should be.
Maybe use it for the evenings instead of during a work day.
In order to train their cognition some participants would like to play more intellectual games in which they train their reaction-time, like: Crosswords, Sudoku, chess, Bridge, Mahjon. Please add these games to the module. Include these games in the module.
Improve the graphics.
Improve the maturity of the game by increasing the difficulty level.

3.6.5.2.4 Task & Time Management module

Since the Romanian/Greek test site did not get the opportunity to evaluate the Calendula (as part of the Task and Time Management module). They were only able to use and evaluate Achievo. In addition, there were only a few Calendula's available for the Swiss and Dutch test-sites to evaluate. Unfortunately, the Swiss participants were only able to limitedly use the Calendula, due to practical reasons (e.g. work restrictions). Therefore the Swiss participants were not able to say something about the added value of the Calendula in the closing interview. Due to this deviation in the evaluation of the Task and Time Management module during the field trials a separation is made in the results between Achievo and the Calendula.

ACHIEVO

1. Added value

A majority of the participants stated that Achievo could not be of added value to them (n=15 Greek/Romanian participants). Most Greek/Romanian participants (53%) do not think Achievo supports them in their work and all Greek/Romanian participants (100%) state that Achievo does not help them to stay focused during the day.

Table 28. An overview of the frequencies and an explanation of the responses from the participants regarding the added value of Achievo.

Question "Do you think achievo could be of added value to you?"		
	Frequencies	**Explanation**
Yes	7	Almost half of the people thinks the module was of added value to them (no arguments available why).
No	8	Half of the people thinks the module is not of added value for them (no arguments available why)

2. Module specific questions

Positive and negative aspects

As shown in Figure 25, most Greek/Romanian participants were of opinion that Achievo is easy to use, that there is a good integration with G-mail and that it quickly syncs with other applications. On the other hand, most Greek/Romanian participants could not easily combine Gsyncit with Achievo, some doubted the privacy of Achievo and missed desktop alerts (Figure 26).

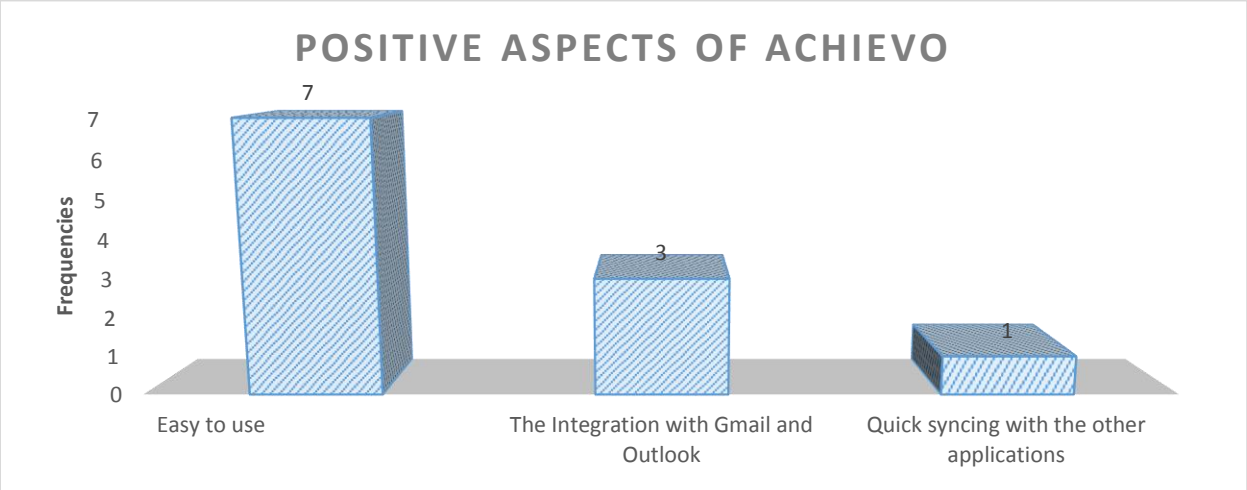


Figure 25. The top three of the most frequently mentioned positive aspects by the participants regarding Achievo (n=6 Greek/Romanian participants).

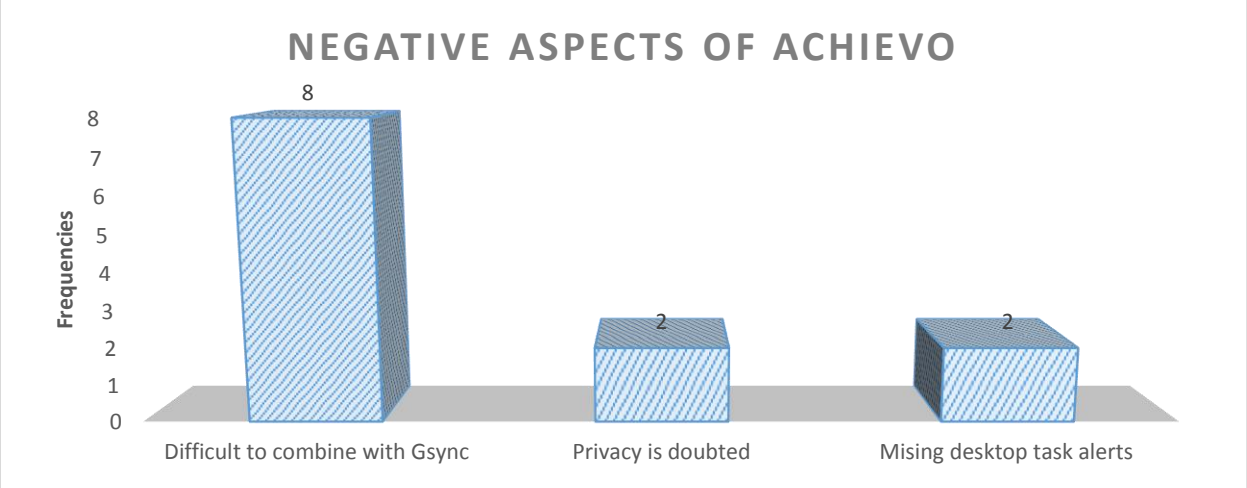


Figure 26. The top three of the most frequently mentioned negative aspects by the participants regarding Achievo (n=10 Greek/Romanian participants).

3. Recommendations

The results of the interviews were used to define specific recommendations for Achievo. They will be used for the further refinement of the module and can be found in Table 29.

Table 29. Recommendations for Achievo resulting from the field trials.

Recommendations - Achievo
Improve the privacy management of Achievo.
Add desktop alerts of upcoming tasks and appointments.

CALENDULA

1. Added value

A majority of the participants stated that the Calendula could not be of added value to them (n=15 Dutch participants). Most Dutch participants (80%) do not think the Calendula supports them in their work and all Dutch participants (100%) state that the Calendula does not help them to stay focused during the day.

Table 30. An overview of the frequencies and an explanation of the responses from the participants regarding the added value of the Calendula.

Question "Do you think the Calendula could be of added value to you?"		
	Frequencies	**Explanation**
Yes	3	A few participants think it is useful to have both a digital agenda and an agenda on paper. In addition, the module provides a clear overview of the tasks and appointments.
No	12	Most participants only prefer the use of a digital agenda, to keep the overview. There were also a lot of technical problems, which they faced in the use of the Calendula.

2. Module specific questions

Positive and negative aspects

As shown in Figure 27, most frequently mentioned positive aspects with regard to the calendula, are: the functionality that your paper agenda gets digitalized, the look of the Calendula and the overview it provides of the appointments and tasks. In addition, the most frequently mentioned negative aspects when considering the responses of the Dutch participants regarding the Calendula are: the synchronisation with the own digital agenda of the user, the OCR and the functionality to easily switch between days in the paper agenda (Figure 28).

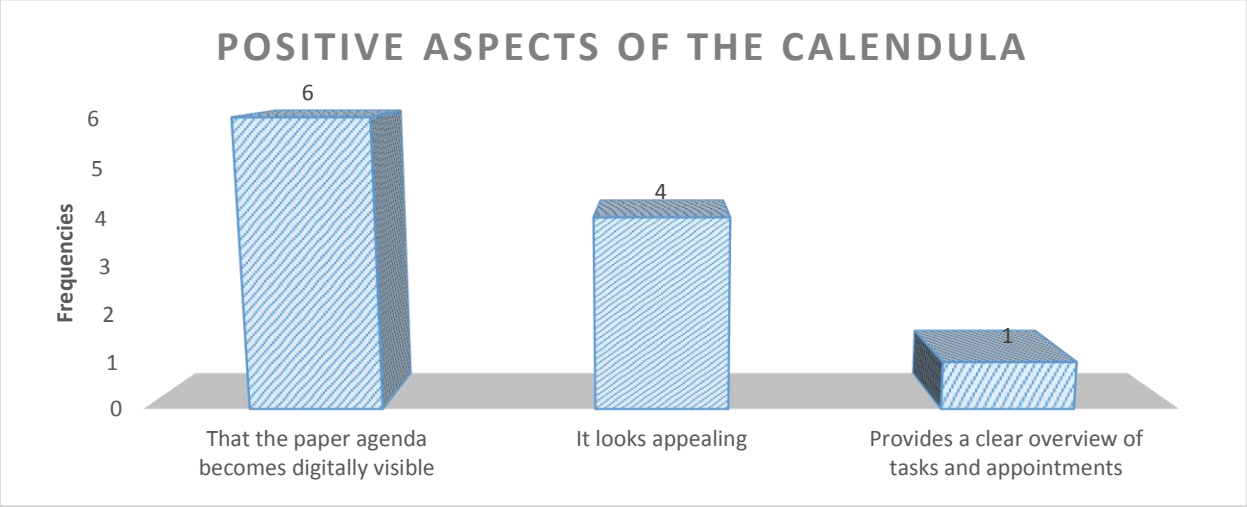


Figure 27. The top three of the most frequently mentioned positive aspects by the participants regarding the Calendula (n=14 Dutch participants).

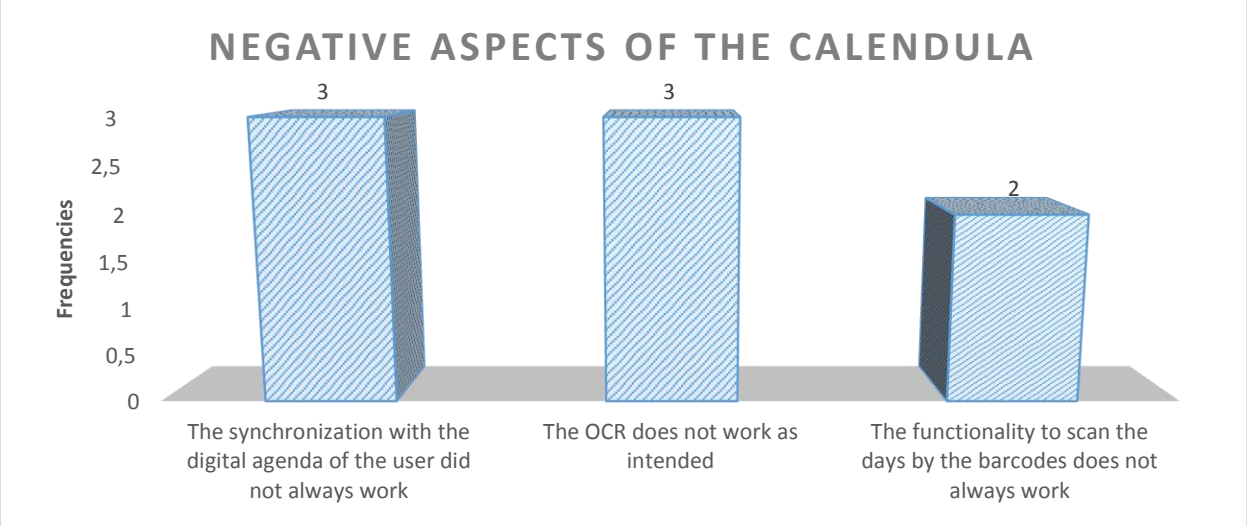


Figure 28. The top three of the most frequently mentioned negative aspects by the participants regarding the Calendula (n=13 Dutch participants).

3. Recommendations

The results of the interviews were used to define specific recommendations for the Calendula. They will be used for the further refinement of the module and can be found in Table 31.

Table 31. Recommendations for the Calendula resulting from the field trials.

Recommendations –Calendula
Make sure the OCR in the calendula recognizes different types of hand writing.
Resolve the technical problems.
Make sure the module is available in multiple languages.
Improve the mobility of the Calendua, so you can easily take it with you.
Resolve the design problems, so it is possible to click easy on all buttons.
Increase the usability of the Calendula.

3.6.5.2.5 Task Switching module

3. Added value

Most participants stated that the Task Switching module could be of added value to them (n=30, of which 15 Dutch and 15 Greek/Romanian participants). Most participants (90%) stated that the Task Switching module could not support them in their work nor could it help the participants to stay focused during the day (100%).

Table 32 An overview of the frequencies and an explanation of the responses from the participants regarding the added value of the Task Switching module.

Question "Do you think this module could be of added value to you?"		
	Frequencies	**Explanation**
Yes	4	People liked that they could change the colours of the lamps. One person thinks the module could be a solution if you want to show other people that you do not want to be disturbed.
No	26	Most people do not see the added value of the module. This, because the module did not worked, people often work on the same task, and other people also need the be aware of the function of the lamps. In addition, they can do it just as easily manually.

4. Module specific questions

Positive and negative aspects

As shown in Figure 29, it is notable that most participants valued the user-friendliness of the module, the fact that you can manually change the colour and brightness of the lights and the atmosphere it provides to the office. On the other hand, the technical problems, the lack of added value and saved time are mentioned as negative aspects of the module (Figure 30).

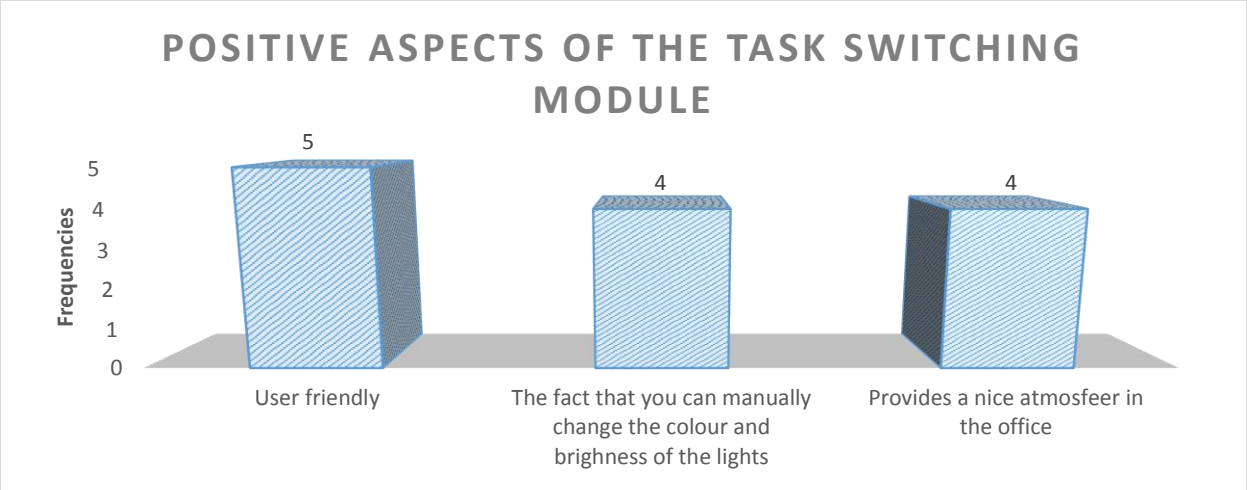


Figure 29 The top three of the most frequently mentioned positive aspects by the participants regarding the Task Switching module (n=18, of which 13 Dutch and 5 Greek/Romanian participants).

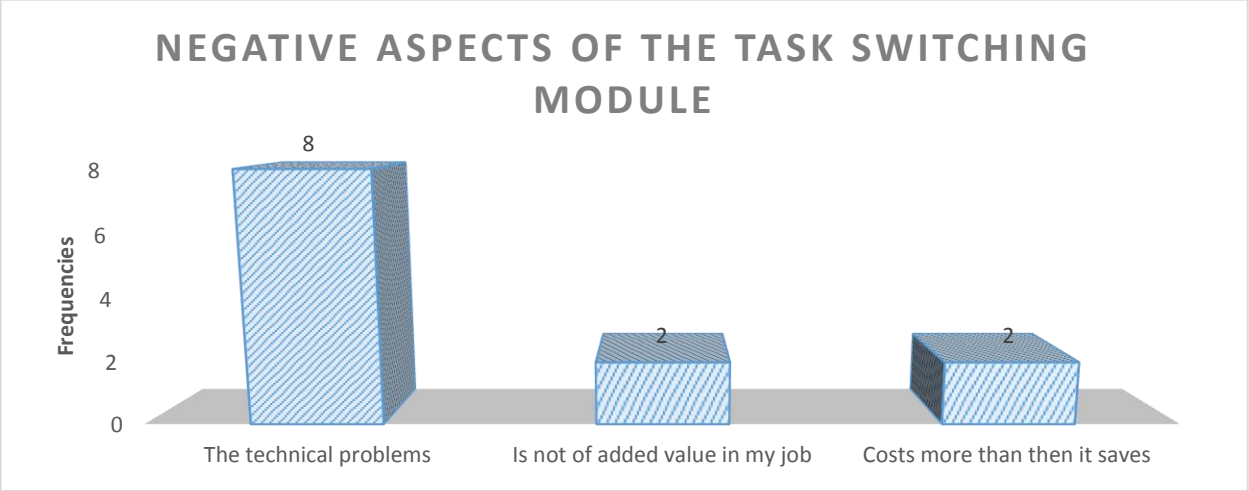


Figure 30 The top three of the most frequently mentioned negative aspects by the participants regarding the Task Switching module (n=14 Dutch participants).

Task switching method

Most participants stated still prefer to switch between tasks by means of the mouse.

Table 33. An overview of the frequencies and an explanation of the responses from the participants regarding method of switching between tasks (n=11, of which 7 Dutch and 4 Greek/Romanian participants).

Question "Which method of task switching did you prefer? Touch screen or mouse. Why?"		
	Frequencies	**Explanation**
Mouse	11	Most people prefer to work with a mouse. They do not like the greasy fingers on the screen. They work with a keyboard, whereby the use of a mouse is more logic. In addition, due to physical problems the use of a mouse is preferred.
Touch screen	0	None of the people prefers to use only a screen. This, because they cannot get along with touch screen or because they do not perceive it as handy. However, one person mentioned the combination of mouse and screen.

3. Recommendations

The results of the interviews were used to define specific recommendations for the Task Switching module. They will be used for the further refinement of the module and can be found in Table 32.

Table 34 Recommendations for the Task Switching module resulting from the field trials.

Recommendations - Task Switching module
Make the lay-out more appealing (e.g. colours, etc.)
Make sure all buttons work.
Make a selection of choices (for example three or four general categories), since the interface is offering to many choices now. In addition, it would be nice when the possibility is offered to define your own categories.
Reduce the amount of tasks whereby you can change the light of the lamps.
Resolve the technical problems in this module.
Create an adjustable setting for the lamp, so it is not always fixed in relation to a certain task.
Reduce the electric intensity of the lamps.
Use a smaller colour lamp.

4 Other stakeholder evaluation

Further to the evaluation activities and outcomes presented in the previous chapter, a dedicated strand of work focused on collating feedback from stakeholders who cannot be considered as immediate end users of the PEARL solutions. For instance, colleagues of older employees using PEARL and other people in the company tend to be affected by any changes introduced through it. Not at least, other stakeholders beyond the immediate end users tend to hold important knowledge about business processes, people's habits and other factors that are likely to have an impact on how PEARL can be mainstreamed within a given organisation.

4.1 Methodological approach

Beyond older end users of PEARL solutions, further stakeholders were involved in the project at an early stage (see D-2.1 Report on User and Stakeholder Requirements). For evaluating their perception of how the utilisation of PEARL potentially impacts on the daily operations of their organisations, a series of stakeholder interviews were conducted according to a common protocol (Appendix E Protocol stakeholder interviews). Overall, 8 interviews were conducted involving different types of stakeholders as follows:

- CEO: A key decision maker or CEO is normally an individual within an organization with executive-level responsibility for strategic planning, strategy implementation, operational management and finance matters. Depending on the size of the organization, high-level management may however be spread across several individuals or be the responsibility of one person. In such cases, the one or more persons in the company were identified who is (are) responsible for (a) team / group organisation and work processes, (b) entitlement of older employees, (c) contractual issues or (d) customer relations & company image.
- *Team Leader*: A team leaders (sometimes also entitled supervisor or line manager) is normally somebody who leads a (revenue-generating) department or team in a company. The team leader tends to be responsible for or to know about management and communication processes within the team, usability (problems) of IT for older people in the team, workplace ergonomics for older people in the team, skills development and further education of older people in the team, mediation between employees and managerial staff as necessary, and customer relations. However, as we were dealing also with smaller organisations there was not necessarily an appointed supervisor/line manager. In such a case, a person was identified in the company being responsible for (a) team or group organisation and work processes or (b) skills development or training of employees in the team.
- *Human-Resource Manager*: This is normally an individual within an organization responsible for hiring new employees, supervising employee evaluations, skills

development and further education, mediation between employees and managerial staff as necessary, and general overseeing of the personnel department. However, within a smaller organisations there may not necessarily be an appointed human resource manager. In such cases, the one or more persons in the company were identified who is responsible for (a) skills & training of employees, (b) hiring new employees or (c) health & safety issues.

- *Colleagues*: Colleagues and co-workers of the older employees who used the PEARL system in the pilot company were interviewed as well. In particular, feedback was sought by employee(s) who regularly worked with PEARL users within a team.

4.2 Perceived impacts

In the following subsections, the outcomes of the stakeholder interviews are presented according to the different types of stake holder interviewed.

4.2.1 Team leader

Assessment dimension	*Perceived positive impacts*
Management of the team & communication among team members	☺ PEARL was perceived as being slightly helpful when it comes to management and communication and the work of older people in the team. ☺ In particular, a slight improvement of the internal communication seemed to happen where trial users had integrated their time management module with the internal communication systems. These users seemed to have started using the corporate communication systems a little more eagerly than before, making the daily department operation a little easier.
Business processes	☺ In particular where trial users had integrated their time management module with the internal communication systems, a positive impact on business process was stated as well due to better communication with others, albeit at a rather moderate level overall.
Development/retaining of work-related skills of older employees in the team	☺ The colleagues that participated in the trials seemed to turn more active during the working day, doing more effective time management. ☺ A slight improvement of their observation skill was perceived as well.
Potential future utilisation	😐 There was no clear interest in the further utilisation of PEARL within the organisation, albeit it was not explicitly denied ☺ When it comes to monetary value assigned to PEARL, five Euro per month and user at maximum were regarded as an appropriate service fee.

4.2.2 Human resource manager

Assessment dimension	*Perceived impacts*
Skills & training of older employees	☺ In particular the e-learning module as perceived to offer some additional valuable help in relation to issues the users tend to experience in relation to MS Excel utilisation ☹ Albeit the learning platform was assessed as looking interesting, a need to feed more interesting and technology-specific subjects into the platform as it currently stands was highlighted. ☹ It was also highlighted that navigation menu would merit from a more user friendly design
Hiring of older employees	☺ Utilisation of physical wellbeing module and the cognitive training module were perceived as helpful in keeping older employees more active, mentally and physically. 😐 It was stated that, at least potentially, utilisation of PEARL might further encourage the hiring older employees by supporting their productivity. ☹ There was a perceived need that the e-learning module needs to be enhanced. With appropriate modifications, this could potentially be part of the corporate training material in the company's intranet portal.
Health and safety issues in the company	☺ The respective module seems to have slightly improved the physical wellbeing of the trial users who have increased their mobility during the office hours. 😐 The safety within the company premises has not been affected ☹ The lack of build-in motivational features encouraging the users to actually utilise the well being module was highlighted as a factor inhibiting potential positive impacts under day-to-day conditions. These could for instance take the form of credit points that can be earned in the sense of a gamification approach.

4.2.3 CEO

Assessment dimension	*Perceived positive impacts*
Team / group organisation and work processes	☺ One respondent stated a positive motivational impact on older employees was perceived. Those who participated in PEARL seemed to have become more open towards new suggestions and working practices. Also, some recent organizational changes were treated in a more positive way compared to changes that had been introduced previously. Employees now seem eager to be part of a corporate vision. I more practical terms, they seemed to have become more eager to actively participate in scheduled meetings and other communication activities, which in the past had been perceived by them rather negatively, e.g. as “a loss of time” or “meaningless exercise” ☹ On the contrary, another respondent did not see PEARL affecting significantly existing management and communication processes within the company’s older colleagues. In particular, no value was perceived to be added by PEARL to a legacy system that was already in place for supporting day-to-day communication and management processes.
Business processes	☺ Some PEARL users seemed to demonstrate slightly higher productivity without, in the same time, being “stuck” on their desk. They seemed eager to tailor the system to their daily job, taking also into account the physical wellbeing proposals. ☺ The time management module was perceived to offer an interesting solution in terms of sharing information among the colleagues about their availability. ☺ The layout of the individual module’s interface was perceived as rather helpful especially for older colleagues with visual impairments. 😐 The e-learning module was assessed as requiring further improvements. Under this precondition, it was however seen as offering potentials for motivating older employees to invest time in their personal development. ☹ Regarding the physical wellbeing module, the motion sensor should be smaller (i.e. in the shape of a wristband), since several times the users were complaining for having to carry it around all the time ☹ A is a perceived need for enabling integration of PEARL solutions with other widely used enterprise applications in order to provide a unified suite for personal development and motivation.
Future use of PEARL	☺ PEARL was assessed as potentially useful if deployed in a wider scale within the company, and maybe not destined only for older colleagues. ☹ Although there was a principle interest in deploying PEARL at wider

	scale, it was clearly perceived as a prototype requiring further development to be commercialized in the future. ☹ As it currently stands, there was no willingness to pay for the PEARL system or individual components.

4.2.4 Colleagues

Assessment dimension	*Perceived positive impacts*
Collaboration in the team and communication among team members	☺ It was reported that team members using PEARL seemed to be more eager to work in teams in the most effective team. ☺ Also, the attitude towards customers was perceived to be impacted by PEARL usage, resulting in a more patient behaviour towards external parties. ☺ Older team members utilising PEARL were perceived as being a bit more enthusiastic, especially in terms of using corporate systems in a correct manner. ☺ Also, social communication habits of PEARL users were perceived to have changed in a positive manner, e.g. in terms of more frequently joining the reminder of the team during lunch/coffee breaks instead of spending such breaks sitting behind the own desks. ☹ The lack of instant messaging features was clearly perceived as deficit of the current system. Such a feature was seen as bearing potentials for considerably enhancing collaboration and communication among team members
Business processes	☺ PEARL users were perceived to more actively participating in department meetings and expressing their interest in gaining new knowledge about job-related issues and trends.
Additional thoughts	☹ The e-learning module was seen to require further improvement and content enhancement. ☹ The mobile app was perceived as being too simplistically designed for being capable of delivering sufficient value to the end user. ☹ Carrying the associated sensor was perceived as rather uncomfortable, whereby options for improvement could be imagined (e.g. taking measurements with help of a smart phone)

5 Conclusion

During the field trial the PEARL modules were evaluated at the test sites of PEARL, in The Netherlands, Romania and Swiss. Each of the test sites has contributed to the evaluation of PEARL and provided valuable information on the platform by having their subjects experience PEARL. However, due to the different execution of the trial at each test-site it is difficult to draw overall conclusions. Therefore this report shows detailed feedback from the evaluation on both module and questionnaire level.

An important finding was that the level of worker productivity, level of confidence and satisfaction with the job as a whole and the work conditions did not significantly change due to the use of PEARL. These small effects can be declared by the facts that: 1. not all trial sites executed the field trial evaluation protocol as intended and 2. the field trial period was relatively short through which it was hard to generate meaningful conclusions out of these trials with regard to the added value of PEARL. However, the 39 subjects that participated in the field trial of PEARL have provided valuable feedback on various aspects of PEARL. The three most reported activities were work, eating and commuting. The corresponding emotions, like stress (m=6.45), fun (m=5.91), satisfaction (m=5.88) and required effort (m=3.71) were all quite positive. Just like the daily level of satisfaction (m=6.8). Out of these results we can conclude that our subjects were quite satisfied with their days and the activities they perform during the workday. However, the overall level of obtained energy from the performed activities was quite low (m=4.80). In addition, the subjects stated that more than half of the health intervention messages of the Physical Wellbeing Module were prompted at a suitable time and subjects were on average compliant with these messages. This indicates that the self-learning mechanisms based on the physical activity pattern from the Baseline period, the current physical activity level and the agenda information shared with Achievo (Task and Time management module) was successful.

We choose to evaluate the PEARL platform in a ‘tough’ field trial of 2 weeks unsupervised training with only a 1,5 hour period to install and instruct participants on what PEARL is, how to start it and how it should be self-explaining from there on. In NL the technological challenge was even higher by including subjects with all types of workplaces, resulting in different combinations of hardware, software and network environments. As a result it was difficult to get the Task Switching module up and running – as it needed to interact with many different resources from PEARL, local hardware and network settings. In addition, during the trials it became clear that the platform was not as self-explaining as we intended it to be, technical support was definitely needed on a regular basis. Therefore, a professional ICT support service (e.g. 24 hour call or chat service) would beneficial to increase the overall usability, commercialisation potential and sustainability of the PEARL platform.

The technical flaws in some of the PEARL modules were reflected in the overall daily rating of the modules. The results of this rating showed that the Physical Wellbeing module, Achievo, the Cognitive training module and E-learning module received positive

scores, while the task switching module and Calendula module received negative scores.

Overall, the most valuable information to further improve PEARL and its modules, is captured in the interviews after subjects have used PEARL for two weeks. The indicated added value, positive and negative aspects of each module show the potential, current state and important improvements of each module. The majority of the participants mentioned that they see potential in the PEARL platform when improved as suggested. The platform is according to them still a prototype version. The suggestions for improvement are stated in recommendation tables provided per PEARL module in chapter 3.6.5.2. These suggestions primarily focus on usability aspects (i.e. simplify the navigation in the module), functionalities (i.e. add desktop alerts of upcoming tasks and appointments) and the content (e.g. improve the maturity of the game by increasing the difficulty level) of the modules. Participants were already able to express their preferences with regards to the modular composition of the PEARL platform and almost all participants, between and within test sites, have different preferences in this aspect. This emphasis the necessity for the user to self-select the modular composition of the PEARL platform, based on their own preferences.

With regard to the results of the other stakeholder evaluation, the feedback collated from the different stakeholders suggests a number of positive potentials generally provided by the piloted PEARL solutions. In particular, these concern positive impact potentials on the motivation of older employees to interact with others (in terms of both formalised work processes and informal social interactions) and to actively care for their own wellbeing at the work place. It may perhaps not come as a surprise that this perception - at least in part - seems to coincide with the perception of slightly increased productivity. It is also striking that some respondents highlighted that PEARL may offer such opportunities not only in relation to older employees but to the workforce more generally.

At the same time, it becomes clear from the interviews that the current prototype version is perceived as requiring further development if it is indeed to be successfully commercialized. However, a number of useful directions can be derived from the interviews in this respect, in relation to functionality (e.g. instant messaging capabilities) and content (e.g. e-learning content) as well as usability (e.g. mobile sensoring). The feedback received from the stakeholders also suggests that interoperability with existing mainstream office/workflow systems is a requirement deserving attention in the framework of further commercialisation of the current prototype version.

A peculiarity in Switzerland was that temporary and seasonal employment contracts increasingly become the norm in Switzerland. “By the mid-2020s, just over half the working population work more than three years for the same employer, and in 2030 this proportion falls to one fourth. Overall, greater flexibility and deregulation of the workplace have led to both a rise in wage inequality and a drop in the security and

duration of employment. Employment contracts are generally only concluded as temporary employment and through sub-contractors."[5]
In these circumstances, it is increasingly difficult for unions to reach and contact workers, a circumstance confirmed by the Swiss seniors testers as well. "A growing proportion of the population has become marginalised by the technological and economic changes, and this exacerbates social inequality. Efforts are made to counter this social exclusion, including the creation of additional training opportunities and forums for cultural exchange."[6]
Technology systems or platforms, like PEARL, allow elderly dependents to stay at home without continual formal or informal ICT support, thus relieving pressure on ICT facilitators (organisations, NGOs, communities). It may allow ICT facilitators to leave recipient alone, or help them in ICT literacy and adaptation.
Tools, like PEARL, could give access to information and training about health and wellbeing, cognitive training, skills for employment, entrepreneurial issues for the dependent older persons, information and training about coping with caring; training for life - language, other work skills, accreditation of skills etc;
During the field trials in Switzerland, concrete needs and examples were listed by the testers: Online (or maybe standalone electronic form) information (websites); training materials (websites, video, games, interactive etc); learning support services – including telephone (and face to face). Therefore PEARL has a good potential to fulfil those needs.

[5] Published by: Swiss Federal Chancellery www.bk.admin.ch/themen/planung, 2014.
[6] ibid.

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Appendix A Information letter and informed consent form

Information letter

Experiencing the PEARL platform

By means of this information letter we would like to inform you about the PEARL (*Platform for ergonomic and motivating, ICT-based, age-friendly workplaces)* project in which six different European countries are involved, including the Netherlands, represented by Roessingh Research and Development (RRD). This letter includes a short description of the overall project goals and the specific objectives of this evaluation study.

Project objectives

The primary objective of the international project PEARL is to develop innovative ICT-based solutions to support office workers in the age of 55 years and older with their daily tasks. This support consists of task management, cognitive training, and coaching towards a healthy physical activity pattern during working hours.

Study objective

This version of the PEARL platform is developed based on the user requirements resulting from previous workplace and usability studies. Within this study we are interested in researching to which extend the current version of PEARL fulfils your wishes and expectations regarding a supportive platform. In order to do so, you will get the PEARL platform available for use in your own work environment. After you have used PEARL, we will ask you about your experiences with PEARL.

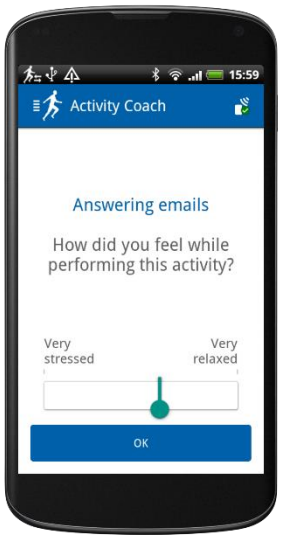

Figure 31 Short questions regarding your work tasks and

Procedure of the study

After we installed PEARL in your workplace, you can freely use the PEARL platform for two weeks. During this period we would like to obtain more information about your experience with the PEARL platform. Therefore we will ask you to answer a few questions at several moments during the study. First, we will provide you with a few questionnaires, at the start and after two weeks of using the PEARL platform. Second, we will ask you to answer short questions about your work tasks and corresponding

feelings several times a day, via the smartphone (see Figure 31 for an example).

What are the components of the PEARL platform?

The PEARL platform consists of an online dashboard that provides access to five modules:

- ***Physical wellbeing*** (*smartphone; movement sensor; web portal*) – This module helps to acquire more insight into your physical activity pattern and to develop a more healthy physical activity pattern (Figure 32). In order to effectively use this module you will be asked to wear a movement sensor. The App will provide you with real-time recommendations on your physical activity pattern, based on the sensor data.
- ***Cognitive training*** *(web portal)* – This module provides cognitive trainings to stay cognitively fit.
- ***Task switcher*** *(App on own PC/Laptop; two ambient lights; RFID-reader and cards)* – This program will help you to easily switch between tasks and to create the optimal light settings for each task. This is to help you, but also your colleagues to easily see whether you are available or not.
- ***Time management*** *(web portal; calendar; digital pen)* – This module helps you with the management of your appointments and tasks.
- ***E-Learning*** *(web portal)* – This module contains a few e-learning modules that could help you with your work.

Figure 32 Physical wellbeing module – the application and an example of an activity suggestion.

In addition to these modules, we will provide you with a *touch screen* display, which you can use next to, or instead of, your own display. This can help you by providing an overview of your tasks and to easily switch between tasks. During the study, you are free to use this screen in the way you prefer. Figure 33 provides an

overview of the overall PEARL set-up. As you can see, you can still use your own computer or laptop, we will only add some extra technology to your workplace.

How much time will it cost me to participate in the study?

We ask a short time investment from you for your participation in this study. Installing the PEARL set-up and filling in the questionnaire at the start will take a *maximum of one hour and a half*. We will ask you to use the PEARL platform at least once a day. You are free to choose how much time you want to spend on the platform. Finally, the App on the smartphone will shortly ask you questions about your work tasks and corresponding feelings about 7-8 times a day. Filling these questions will take you about 1-2 minutes each time, with a maximum of 15 minutes per day. And finally, at the end of the study we will de-install PEARL and will provide you with a few end-questionnaires,

which will take a *maximum of 45 minutes* of your time.

Privacy

To make optimal use of the *Physical Wellbeing module* [illegible] *Management module*, you will be asked to share your agenda with the PEARL platform. We will help you to make this connection and your data will only be made available to you. The researchers from the PEARL project (RRD) will only use the start and end-times of your appointments for their research regarding day-patterns, physical activity & wellbeing. All other information from your calendar (appointment title, location, content) will be deleted from PEARL after the end of the study.

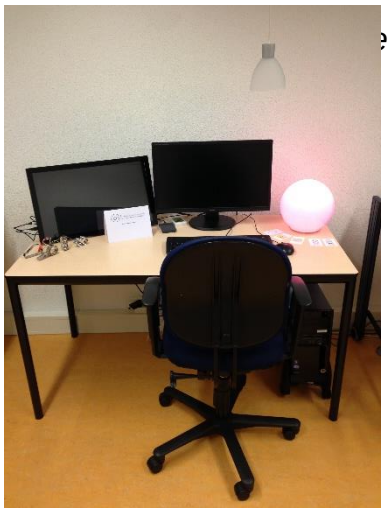

Figure 33 PEARL set-up.

The data that you generate during the use of the PEARL platform, will be safely and anonymously stored in a local database of Roessingh Research and Development (RRD) and project partners Singular Logic and e-Doceo, who host the platform. In addition, the answers to the questionnaires and your physical activity data will be analysed by RRD for research purposes and saved in a local and secure database. The data will not be shared with your manager; only you and the researchers will have insight in your data, as described above.

Results

The information resulting from this scientific research will directly contribute to the development of technology that could support office workers with their work activities. We expect that this information will also contribute to more comfortable workplaces, optimally configured to personal preferences and needs that will change over time.

We hope that this information gave you a clear overview of the objective and procedure of the study and that we have made you enthusiastic for participation. If you have any questions about the study or if you would like to receive additional information, then please feel free to contact one of the researchers stated below.

Kind regards,

Mirka Evers, Msc.

Roessingh Research and Development

E-mail m.evers@rrd.nl

Tel. 053 487 5777

Simone Boerema, Msc.

Roessingh Research and Development

E-mail s.boerema@rrd.nl

Tel. 053 487 5777

Appendix: informed consent

Appendix B Informed Consent

Project name: **PEARL – Platform for ergonomic and motivating, ICT-based age-friendly workplaces**

Study title: *Experiencing the PEARL platform*

I hereby declare that I have read the information letter and that I am clearly informed about the intentions, method and objective of this study. All my questions are answered and I received enough time to make an informed decision about my participation.

My choice to participate in this study is completely voluntary. I thereby preserve my right to withdraw from participation, at any moment, without giving a reason. However, the data collected until my withdrawal may be used for the development and research purposes as described in the information letter. Withdrawal from my consent will not have any negative effects on my work and work environment.

I give my consent that my data will be handled confidentially for the purpose of the PEARL project and that it will be encoded in such a way that it cannot be traced back to me. By this we mean that the participants' name will never be connected or saved with the other data collected in the study, this to ensure the anonymity of the participant. The data will be saved in electronic databases of Roessingh Research and Development, Singular Logic and e-Doceo. In addition, the results of the study may be used for scientific papers and will be also saved anonymously in electronical data bases of Roessingh Research and Development.

Name :

Address :

Residence :

Date : Signature participant :

Date : Signature researcher :

Appendix C Equipment list

Below is the equipment list for the final field trials. Each trial site will have 5 or more full PEARL setups for the field trials.

PEARL module	Type	Description	Model	Estimated costs per item	Number of items per workplace
General setup	Workplace	Extra touch display	Ilyama Prolite T2435MSC-B1 or B2	€ 349	1
General setup	Workplace	Normal display + computer or laptop	-	X	1
General setup	Workplace	Video card for two parallel displays	MSI GeForce 210 TC 1GB DDR3	€ 32	1
General setup	Network	Servers (RRD, SiLO, E-Doceo)	-	X	0
General setup	RFID	RFID reader	SYRIS Model RD200 M1-G	€ 123	1
General setup	RFID	2 or 3 RFID cards	Mifare 1k or mifare ultralight or NTAG203	€ 1	10
General setup	Light	2 Limiteless LED light bulbs: RGBWW + WW/CW	Limiteless LED	€ 17	2
General setup	Light	Light/Wi-Fi bridge v5.0	Limiteless LED - bridge	€ 18	1
General setup	Light	Table lamp (availability indicator)	IKEA - Fado	€ 10	1
General setup	Light	Table lamp (ambient light)	IKEA - Nyfors or UPPBO	€ 60	1
Task Switching	-	No additional equipment required			
Cognitive training	-	No additional equipment required			
Physical wellbeing	Wearable	RRD activity sensor + clips to hold the sensor	Promove 3D	€ 600	1
Physical wellbeing	Wearable	Charger RRD activity sensor (usb-mini)	Promove 3D	€ 20	1
Physical wellbeing	Wearable	Smartphone with Activity App (RRD)	HTC desire	€ 250	1
Physical wellbeing	Wearable	Charger smartphone (usb-micro)	HTC desire	€ 20	1
Physical wellbeing	Wearable	Mobile case	HTC desire	€ 30	1
Physical wellbeing	Wearable	Storage box	Box	€ 25	1
Physical wellbeing	Wearable	Mobile subscription (± 1 GB is be needed)		€ 20	1
Physical wellbeing	Software	Outlook-Google calendar syncer	-		1
Task & Time Mangement	User Input	Calendula			1
Task & Time Mangement	Wearable	Mobile subscription (± 1 GB is be needed)		€ 20	1
E-learning	-	No additional equipment required			

Appendix D Datasheet – to collect answers of participants

Demographics

Participant number	
Date	
Age	
Gender	
Profession	
Colour-blind	YES/NO
Number of contract hours per week	hours
Percentage of worktime working with PC	%

The PEARL platform as a whole

Question	**Open answer**
What is your first (overall) impression of PEARL?	

E-Learning & Skills Development

Potential effect

Question	**Answer**	**Open answers**
Do you feel this module was of added value to you? **If yes**, in what way? (Continue by asking each of the following questions. Ask for a really short reply on each suggestion, only the first thing that comes to their mind.) **If no,** do you feel it could be of added value to others? If so, why?	YES / NO	
- By supporting you in your work? If yes, in what way?	YES / NO	
- By relaxing? If yes, in what way?	YES / NO	
- Training/increasing your skills? If yes, in what way?	YES / NO	

- Otherwise?	YES / NO	
Content questions		
Could you name three things you like about the module?	1 2 3	
Could you name three things you dislike about the module?	1 2 3	
Do you think this module could help you to develop your personal skills?		
Do you think this module could help you to share your skills with others?		

System Usability Scale

Strongly disagree	**1**	**2**	**3**	**4**	**5**	**Strongly agree**
1. I think that I would like to use this system frequently						
2. I found the system unnecessarily complex						
3. I thought the system was easy to use						
4. I think that I would need the support of a technical person to be able to use this system						
5. I found the various functions in this system were well integrated						
6. I thought there was too much inconsistency in this system						
7. I would imagine that most people would learn to use this system very quickly						
8. I found the system very cumbersome to use						
9. I felt very confident using the system						
10. I needed to learn a lot of things before I could get going with this system						

Physical Wellbeing module

Potential effect

Question	**Answer**	**Open answers**
Do you feel this module was of added value to you? **If yes**, in what way? (Continue by asking each of the following questions. Ask for a really short reply on each suggestion, only the first thing that comes to their mind.) **If no,** do you feel it could be of added value to others? If so, why?	YES / NO	
- By supporting you in your work? If yes, in what way?	YES / NO	
- By relaxing? If yes, in what way?	YES / NO	
- Training/increasing your physical health? If yes, in what way?	YES / NO	
- To stay focused during your workday? If yes, in what way?	YES / NO	
- Otherwise?	YES / NO	
Content questions		
Could you name three things you like about the module?	1 2 3	
- Could you name three things you dislike about the module?	1 2 3	
Is this (messages including physical activity suggestions) how you would like to be motivated to be more physically active during the workday?		
Provides the portal an intuitive representation of your physical activity per day/work week?		
	Answer	Open answers
Do you feel this module was of added value to you? **If yes**, in what way? (Continue by asking each of the following questions. Ask for a really short reply on each suggestion, only the first thing that comes to their	YES / NO	

mind.) - **If no,** do you feel it could be of added value to others? If so, why?		
By supporting you in your work? If yes, in what way?	YES / NO	
By relaxing? If yes, in what way?	YES / NO	
Training/increasing your physical health? If yes, in what way?	YES / NO	
To stay focused during your workday? If yes, in what way?	YES / NO	
Otherwise?	YES / NO	
Content questions		
Could you name three things you like about the module?	1 2 3	

System Usability Scale

Strongly disagree	**1**	**2**	**3**	**4**	**5**	**Strongly agree**
1. I think that I would like to use this system frequently						
2. I found the system unnecessarily complex						
3. I thought the system was easy to use						
4. I think that I would need the support of a technical person to be able to use this system						
5. I found the various functions in this system were well integrated						
6. I thought there was too much inconsistency in this system						
7. I would imagine that most people would learn to use this system very quickly						
8. I found the system very cumbersome to use						
9. I felt very confident using the system						
10. I needed to learn a lot of things before I could get going with this system						

Cognitive Training module

Potential effect

	Answer	Open answers
Do you feel this module was of added value to you? **If yes**, in what way? (Continue by asking each of the following questions. Ask for a really short reply on each suggestion, only the first thing that comes to their mind.) **If no,** do you feel it could be of added value to others? If so, why?	YES / NO	
- By supporting you in your work? If yes, in what way?	YES / NO	
- By relaxing? If yes, in what way?	YES / NO	
- Training your cognition/memory? If yes, in what way?	YES / NO	
- To stay focused during your workday? If yes, in what way?	YES / NO	
- Otherwise?	YES / NO	
Content questions		
Could you name three things you like about the module?	1 2 3	
- Could you name three things you dislike about the module?	1 2 3	
Are these the games you would like to play to stimulate your cognition?		
Would other games be more suitable? If yes, which ones?		

	Answer	Open answers
Do you feel this module was of added value to you? **If yes**, in what way? (Continue by asking each of the following questions. Ask for a really short reply on each suggestion, only the first thing that comes to their mind.) - **If no,** do you feel it could be of added value to others? If so, why?	YES / NO	
By supporting you in your work? If yes, in what way?	YES / NO	
By relaxing? If yes, in what way?	YES / NO	
Training your cognition/memory? If yes, in what way?	YES / NO	
To stay focused during your workday? If yes, in what way?	YES / NO	
Otherwise?	YES / NO	
Content questions		
Could you name three things you like about the module?	1 2 3	

System Usability Scale

Strongly disagree	**1**	**2**	**3**	**4**	**5**	**Strongly agree**
1. I think that I would like to use this system frequently						
2. I found the system unnecessarily complex						
3. I thought the system was easy to use						
4. I think that I would need the support of a technical person to be able to use this system						
5. I found the various functions in this system were well integrated						
6. I thought there was too much inconsistency in this system						
7. I would imagine that most people would learn to use						

this system very quickly						
8. I found the system very cumbersome to use						
9. I felt very confident using the system						
10. I needed to learn a lot of things before I could get going with this system						

Task Switching

Potential effect

Question	**Answer**	**Open answers**
Do you feel this module was of added value to you? **If yes**, in what way? (Continue by asking each of the following questions. Ask for a really short reply on each suggestion, only the first thing that comes to their mind.) **If no,** do you feel it could be of added value to others? If so, why?	YES / NO	
- By supporting you in your work? If yes, in what way?	YES / NO	
- To stay focused during your workday? If yes, in what way?	YES / NO	
- Otherwise?	YES / NO	
Content questions		
Could you name three things you like about the module?	1 2 3	
Could you name three things you dislike about the module?	1 2 3	
Which method of task switching did you prefer? Touch screen or mouse. Why?		

System Usability Scale

Strongly disagree	1	2	3	4	5	Strongly agree
1. I think that I would like to use this system frequently						
2. I found the system unnecessarily complex						
3. I thought the system was easy to use						
4. I think that I would need the support of a technical person to be able to use this system						
5. I found the various functions in this system were well integrated						
6. I thought there was too much inconsistency in this system						
7. I would imagine that most people would learn to use this system very quickly						
8. I found the system very cumbersome to use						
9. I felt very confident using the system						
10. I needed to learn a lot of things before I could get going with this system						

Task and time management (including the Calendula)

Potential effect

Question	Answer	Open answers
Do you feel this module was of added value to you? **If yes**, in what way? (Continue by asking each of the following questions. Ask for a really short reply on each suggestion, only the first thing that comes to their mind.) **If no,** do you feel it could be of added value to others? If so, why?	YES / NO	
- By supporting you in your work? If yes, in what way?	YES / NO	
- To stay focused during your workday? If yes, in what way?	YES / NO	
- Otherwise?	YES / NO	

Content questions		
Could you name three things you like about the module?	1 2 3	
Could you name three things you dislike about the module?	1 2 3	

System Usability Scale

Strongly disagree	1	2	3	4	5	Strongly agree
1. I think that I would like to use this system frequently						
2. I found the system unnecessarily complex						
3. I thought the system was easy to use						
4. I think that I would need the support of a technical person to be able to use this system						
5. I found the various functions in this system were well integrated						
6. I thought there was too much inconsistency in this system						
7. I would imagine that most people would learn to use this system very quickly						
8. I found the system very cumbersome to use						
9. I felt very confident using the system						
10. I needed to learn a lot of things before I could get going with this system						

Task and time management (without the Calendula*)

Potential effect

Question	Answer	Open answers
Do you feel this module was of added value to you?	YES / NO	

If yes, in what way? (Continue by asking each of the following questions. Ask for a really short reply on each suggestion, only the first thing that comes to their mind.) **If no,** do you feel it could be of added value to others? If so, why?		
- By supporting you in your work? If yes, in what way?	YES / NO	
- To stay focused during your workday? If yes, in what way?	YES / NO	
- Otherwise?	YES / NO	
Content questions		
Could you name three things you like about the module?	1 2 3	
Could you name three things you dislike about the module?	1 2 3	

System Usability Scale

Strongly disagree	**1**	**2**	**3**	**4**	**5**	**Strongly agree**
1. I think that I would like to use this system frequently						
2. I found the system unnecessarily complex						
3. I thought the system was easy to use						
4. I think that I would need the support of a technical person to be able to use this system						
5. I found the various functions in this system were well integrated						
6. I thought there was too much inconsistency in this system						
7. I would imagine that most people would learn to use this system very quickly						
8. I found the system very cumbersome to use						

9. I felt very confident using the system						
10. I needed to learn a lot of things before I could get going with this system						

*Not all participants had the opportunity the use the Calendula, since there were 5 Calendula's made available by AIT for both the Dutch and the Swiss participants.

Appendix E Protocol stakeholder interviews

Interview schedule – Key decision maker / CEO

1. Before you start the interview

1.1. Who should you talk to

A key decision maker or CEO is normally an individual within an organization with executive-level responsibility for strategic planning, strategy implementation, operational management and finance matters. Depending on the size of the organization, high-level management may be spread across several individuals or be the responsibility of one person.

To find the right interview partner, therefore please identify the person (or persons) in the company who is responsible for:

- Team / group organisation and work processes
- Entitlement of older employees
- Contractual issues
- Customer relations & company image

As also different people in the company are responsible for the topics listed above, the right interviewee needs to be defined per topic.

1.2. Using this schedule

Generally it is described in each part of the schedule below what you have to do. Parts of the schedule need to be completed during the interview, others afterwards. You can take a printed version of the schedule to the interview to make hand-written notes. For this you can also use additional sheets of paper, if necessary.

After the interview, all information needs to be typed in English language into this schedule document, and the document sent to empirica. Make sure that you store a copy of the filled-in schedule at your own premises.

2. INTERVIEW schedule

2.1. General information to note down

Please complete the table below during the interview.

Date of the interview		
Time of the interview	**Start time:**	**End time:**
Job title of interviewee		
Topics covered:		
Team / group organisation and work processes	[ ] yes	[ ] no
Entitlement of older employees	[ ] yes	[ ] no
Contractual issues	[ ] yes	[ ] no
Customer relations & company image	[ ] yes	[ ] no
Name of interviewer		

2.2. Introduction

- *Introduce researchers: give your name or names and explain your role as an interviewer.*
- *Explain purpose of the interview: PEARL was trialled in the company for a number of weeks and the project partners are now interested in identifying how PEARL has impacted on the different groups of staff working in the company.*
- *Consent form: use the Consent Form provided with the schedule and the Guidelines. Note that the form MUST be filled in and signed by every interviewee. Make sure to collect the completed form after the interview and store it safely at your premises for future reference.*

2.3. Topic A: Team / group organisation and work processes

*Main areas where respondent sees PEARL as helpful when it comes to **management and communication** and the work of older people in the company.*

*Main areas where respondent sees that PEARL could be improved to be more helpful when it comes to **management and communication** and the work of older people in the company*

2.4. Topic B: Business processes

*Main areas where respondent sees PEARL as helpful when it comes to **business or work processes** and the work of older people in the company*

*Main areas where respondent sees that PEARL could be improved to be more helpful when it comes to **business or work processes** and the work of older people in the company*

2.5. Topic C: Customer relations & company image

*Main areas where respondent sees PEARL as helpful when it comes to **customer relations / company image** and the work of older people in the company*

*Main areas where respondent sees that PEARL could be improved to be more helpful when it comes to **customer relations / company image** and the work of older people in the company*

2.6. Future use of PEARL

Ask interviewee whether he/she would consider using PEARL for his or her team in the future.

Ask interviewee how much he would be willing to pay on a regular basis to be able to use PEARL for the whole team, e.g. compared to other software licenses the company is paying for.

2.7. Additional thoughts

Any additional thoughts on PEARL and its impacts the respondent voiced during the interview or might want to add.

PEARL evaluation other stakeholders: Interview schedule - Team leaders

1. Before you start the interview

1.1. Who should you talk to

A team leader/supervisor/line manager/ is normally somebody who leads a (revenue-generating) department or team in the company and is in his/her position responsible for or knows about management and communication processes within the team, usability (problems) of IT for older people in the team, workplace ergonomics for older people in the team, skills development and further education of older people in the team, mediation between employees and managerial staff as necessary, and customer relations.

However, as we are dealing often with smaller organisations there might not necessarily be appointed supervisors/line managers. Thus, we kindly ask you to identify the person in the company who is responsible for:

- Team / group organisation and work processes
- Skills & training of employees in the team

As also different people in the company are responsible for the topics listed above, the right interviewee needs to be defined per topic.

1.2. Using this schedule

Generally it is described in each part of the schedule below what you have to do. Parts of the schedule need to be completed during the interview, others afterwards. You can take a printed version of the schedule to the interview to make hand-written notes. For this you can also use additional sheets of paper, if necessary.

After the interview, all information needs to be typed in English language into this schedule document, and the document sent to empirica. Make sure that you store a copy of the filled-in schedule at your own premises.

2.INTERVIEW schedule

2.1. General information to note down

Please complete the table below during the interview.

Date of the interview		
Time of the interview	**Start time:**	**End time:**
Job title of interviewee		
Topics covered:		
Team / group organisation and work processes	[ ] yes	[ ] no
Skills & training of employees in the team	[ ] yes	[ ] no
Entitlement of older employees	[ ] yes	[ ] no
Customer relations & company image	[ ] yes	[ ] no
Name of interviewer		

2.2. Introduction

- *Introduce researchers: give your name or names and explain your role as an interviewer.*
- *Explain purpose of the interview: PEARL was trialled in the company for a number of weeks and the project partners are now interested in identifying how PEARL has impacted on the different groups of staff working in the company.*
- *Consent form: use the Consent Form provided with the schedule and the Guidelines. Note that the form MUST be filled in and signed by every interviewee. Make sure to collect the completed form after the interview and store it safely at your premises for future reference.*

2.3. Topic A: Management of the team and communication among team members

*Main areas where respondent sees PEARL as helpful when it comes to **management and communication** and the work of older people in the team*

*Main areas where respondent sees that PEARL could be improved to be more helpful when it comes to **management and communication** and the work of older people in the team*

2.4. Topic B: Business processes

*Main areas where respondent sees PEARL as helpful when it comes to **business or work processes** and the work of older people in the team*

*Main areas where respondent sees that PEARL could be improved to be more helpful when it comes to **business or work processes** and the work of older people in the team*

2.5. Topic C: Development/retaining of work-related skills of older employees in the team

*Main areas where respondent sees PEARL as helpful when it comes to **work-related skills** of older people in the team*

*Main areas where respondent sees that PEARL could be improved to be more helpful when it comes to **work-related skills** of older people in the team*

2.6. Future use of PEARL

Ask interviewee whether he/she would consider using PEARL for his or her team in the future.

Ask interviewee how much he would be willing to pay on a regular basis to be able to use PEARL for the whole team, e.g. compared to other software licenses the company is paying for.

2.7. Additional thoughts

Any additional thoughts on PEARL and its impacts the respondent voiced during the interview or might want to add.

PEARL evaluation other stakeholders:
Interview schedule - Human Resource Manager

1. Before you start the interview

1.1. Who should you talk to

A Human-Resource Manager is normally an individual within an organization responsible for hiring new employees, supervising employee evaluations, skills development and further education, mediation between employees and managerial staff as necessary, and general overseeing of the personnel department.

However, as we are dealing often with smaller organisations there might not necessarily be an appointed human resource manager. Thus, we kindly ask you to identify the person in the company who is responsible for:

- Skills & training of employees
- Hiring new employees
- Health & safety issues

As also different people in the company are responsible for the topics listed above, the right interviewee needs to be defined per topic.

1.2. Using this schedule

Generally it is described in each part of the schedule below what you have to do. Parts of the schedule need to be completed during the interview, others afterwards. You can take a printed version of the schedule to the interview to make hand-written notes. For this you can also use additional sheets of paper, if necessary.

After the interview, all information needs to be typed in English language into this schedule document, and the document sent to empirica. Make sure that you store a copy of the filled-in schedule at your own premises.

2.INTERVIEW schedule

2.1. General information to note down

Please complete the table below during the interview.

Date of the interview		
Time of the interview	**Start time:**	**End time:**
Job title of interviewee		
Topics covered:		
Skills & training of older employees	[ ] yes	[ ] no
Hiring new employees	[ ] yes	[ ] no
Health & safety issues	[ ] yes	[ ] no
Name of interviewer		

2.2. Introduction

- *Introduce researchers: give your name or names and explain your role as an interviewer.*
- *Explain purpose of the interview: PEARL was trialled in the company for a number of weeks and the project partners are now interested in identifying how PEARL has impacted on the different groups of staff working in the company.*
- *Consent form: use the Consent Form provided with the schedule and the Guidelines. Note that the form MUST be filled in and signed by every interviewee. Make sure to collect the completed form after the interview and store it safely at your premises for future reference.*

2.3. Topic A: Skills & training of older employees

Main areas where respondent sees PEARL as helpful when it comes to **training / continuous vocational education** *of older people in the company*

Main areas where respondent sees that PEARL could be improved to be more helpful when it comes to **training / continuous vocational education** *of older people in the company*

2.4. Topic B: Hiring of older employees

Main areas where respondent sees PEARL as helpful when it comes to ***hiring older people in the company*** *of older people in the company*

Main areas where respondent sees that PEARL could be improved to be more helpful when it comes to ***hiring older people in the company*** *of older people in the company*

2.5. Topic C: Health and safety issues in the company

Main areas where respondent sees PEARL as helpful when it comes to ***health and safety*** *of older people in the company*

*Main areas where respondent sees that PEARL could be improved to be more helpful when it comes to **health and safety** of older people in the company*

2.6. Additional thoughts

Any additional thoughts on PEARL and its impacts the respondent voiced during the interview or might want to add.

PEARL evaluation other stakeholders: Interview schedule - Colleagues / co-workers

1. Before you start the interview

1.1. Who should you talk to

The target group of the interview are colleagues/co-workers of the older employees who used the PEARL system in the pilot company. You should try to find colleagues of the older employee(s) who regularly work with them as a team. The colleagues do not have to be older employees themselves.

1.2. Using this schedule

Generally it is described in each part of the schedule below what you have to do. Parts of the schedule need to be completed during the interview, others afterwards. You can take a printed version of the schedule to the interview to make hand-written notes. For this you can also use additional sheets of paper, if necessary.

After the interview, all information needs to be typed in English language into this schedule document, and the document sent to empirica. Make sure that you store a copy of the filled-in schedule at your own premises.

2. FOCUS GROUP schedule

2.1. General information to note down

Please complete the table below during the interview.

Date of the interview		
Time of the interview	**Start time:**	**End time:**
Job title of interviewee		
Topics covered:		
Team / group organisation and work processes	[ ] yes	[ ] no
Skills & training of employees in the team	[ ] yes	[ ] no
Entitlement of older employees	[ ] yes	[ ] no
Customer relations & company image	[ ] yes	[ ] no
Name of interviewer		

2.2. Introduction

- *Introduce researchers: give your name or names and explain your role as an interviewer.*
- *Explain purpose of the interview: PEARL was trialled in the company for a number of weeks and the project partners are now interested in identifying how PEARL has impacted on the different groups of staff working in the company.*
- *Consent form: use the Consent Form provided with the schedule and the Guidelines. Note that the form MUST be filled in and signed by every interviewee. Make sure to collect the completed form after the interview and store it safely at your premises for future reference.*

2.3. Topic A: Collaboration in the team and communication among team members

*Main areas where respondent sees PEARL as helpful when it comes to **collaboration and communication** and the work in the team*
*Main areas where respondent sees that PEARL could be improved to be more helpful when it comes to **collaboration and communication** and the work in the team*

2.4. Topic B: Business processes

*Main areas where respondent sees PEARL as helpful when it comes to **business or work processes** and the work in the team*

*Main areas where respondent sees that PEARL could be improved to be more helpful when it comes to **business or work processes** and the work in the team*

2.5. Additional thoughts

Any additional thoughts on PEARL and its impacts the respondent voiced during the interview or might want to add.