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Fit4WORK

SELF-MANAGEMENT OF PHYSICAL AND MENTAL FITNESS OF OLDER WORKERS



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SELF-MANAGEMENT OF PHYSICAL AND MENTAL FITNESS OF OLDER WORKERS

Project coordinator: Poznań Supercomputing and Networking Center, ul. Jana Pawła II 10, 61-139 Poznań, Poland, email: fit4work@fit4work-aal.eu

Pilot Trial Methodology

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Lead author: Marije Blok, KBO-PCOB

Co-authors: Christien Müskens KBO-PCOB

Nora Ramadani, KBO-PCOB

Jan Brinkers, KBO-PCOB

Michał Kosiedowski, Poznań Supercomputing and Networking Center

Robert Szeklicki, Poznań University of Physical Education

Božidara Cvetković, Jožef Stefan Institute

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1. Introduction

The Fit4Work project aims to develop a system that enables persons aged 55 and over to be healthy and maintain good functional capacities for work. In this way the project answers the need to facilitate continuation of professional careers, making ageing workers aware of a better transition into ‘golden years’ of their work span and prepare enterprises to develop their work environments with age-related issues incorporated into the frame of their business.

Previously in the project, usability requirements were defined. By means of an extensive internationally distributed survey, literature research, interviews and a focus group session we identified the preferences, needs and expectations of the prospect end-users. Topics included 1) the device(s) to be used; 2) the kind of information to be monitored with the product (what is possible, what is desirable?); 3) use(r)-related factors, concerning both characteristics of the device and the user; 4) the setting in which the product can be used and 5) privacy related issues. This resulted in a document with end-user requirements, categorized in the mentioned topics.

The present document aims at defining the guidelines for the different pilot testing phases. The standard protocols for testing the Fit4Work system across the whole validation phase are described herewith.

The pilot testing will take place in two stages:

1. In the first stage an early prototype will be tested by 8 test-users in the Netherlands. The aim of this first explorative stage of evaluation is to discover the usability of the Fit4Work system among a variety of users in the actual field setting in which the end solution developed by the project is foreseen to be used. This stage will run in parallel with the system developments, therefore its critical aspect is to ensure a proper communication channel or protocol between the test users and the developers. This first stage of evaluation will take 2 months.
2. The final prototype of the system will be tested in the second pilot trial – the validation stage, which takes place at the end of the project. The pilots within this trial will take place in different settings, in the Netherlands (organized by KBO-PCOB) and Poland (organized by PSNC). This allows the consortium to test the prototype among different groups of older adults. Paid and voluntary workers will test the prototype at both the desk work and physical active work setting. The aim of this validation stage is to find out whether the project was successful in developing useful and functional solution for managing their physical and mental fitness.

The report presents the aims of assessment of the solution developed within the project in Section 2. The planning of the solution piloting is discussed in Section 3 (general planning) and Section 4 and 5 (pilot 1 and 2 respectively). Discussion on usability and acceptance testing is presented in Section 6. The report ends with annexes containing the informed consent template and questionnaire tools to be used during assessments.

2. Aims of assessment

2.1. Assessment objectives

The general scope of the assessment is to gain a high level of compatibility of the Fit4Work system with users' expectations and needs both from a usability and functional point of view in line with an incremental user-centric development methodology. The conformance of the usability and functionality of the product to users' requirements will be evaluated in order to have an early feedback about the system function, its acceptability and usability from an older adult viewpoint and the system will be constantly re-adapted to meet their requirements.

Another objective of the evaluation process is to provide organizations with an innovative easy-to-use and unobtrusive system that will support older workers in reducing and managing physical and mental stress resulting from their occupation. The system will provide ambient ways of monitoring physical and mental activities at work. Smart algorithms will provide context-sensitive personalized recommendations for adjusting the workplace and behavior at work, as well as define lifestyle plans to meet the demands of the work taking into consideration the worker's age. The currently described assessment will help to deliver a system which perfectly meets the preferences of the prospect client.

The specific objectives of the assessment are strictly connected with the level of development of the product. As assessments will be implemented alongside the project, we need to make certain that there is significant synergy between the scopes of assessment across the several evaluations using a similar methodology.

For this reason, the general evaluation procedure described in this deliverable provides a consistent basis for the setting down of our framework methodology for the following assessments. At the same time, this procedure will be better specified in the following deliverables of WP2 in close relation with the testing activities we will run along WP2 and the correspondent level of the development of the product. The specific objectives of each evaluation will be better defined and some description of variables to assess will be provided.

2.2. Parameters of success

The success of the project should be measured on several layers. These layers include, among others, a variety of aspects concerning the use(r) of the system; publicity for the concept and dissemination. First, the system will be tested and validated at supporting end-users in improving specific aspects of their lives (WHOQOL, H-RF, Physical activity, PSS and Environment). Next the technology developed by the project should be accepted and usable by the prospect end-users (Acceptance & Usability).

2.2.1. Quality of life of end users (Quantitative)

- **Description:** Increase of Quality of Life of the end-users taking advantage of the system
- **Method of verification:** WHOQOL instrument before and after using the Fit4Work system
- **Target:** End users increase quality of their lives according to the WHOQOL

2.2.2. Health-related fitness (H-RF) of end users (Quantitative)

- **Description:** H-RF refers to those components of fitness that are affected by habitual physical activity and relate to health status

- **Method of verification:** Senior Fitness Test
- **Target:** at least 75th percentile (with relation to age and gender of the actual end-user)

2.2.3. Physical activity of end users (Quantitative)

- **Description:** Every movement of the body caused by skeletal muscle and related with energy expenditure above the resting metabolic rate
- **Method of verification:** average daily energy expenditure
- **Target:** 200 kcal/day

2.2.4. Project acceptance by end users (Qualitative)

- **Description:** Project design should answer the needs of the end users
- **Method of verification:** Verification of the user requirements, system specification with different groups of end users
- **Target:** User requirements recognized by end users survey (50 person per country), by feedback from end users experts, by pilot trials

2.2.5. System usability (Qualitative)

- **Description:** Realization of end-user needs in an effective, efficient, satisfactory way
- **Method of verification:** Usability assessment by end-user feedback reception through interviews, surveys, end-user direct observation, monitoring in different cycles of project development – developments, tests, deployments
- **Target:** High usability of the system proven by the feedback from end-users

2.2.6. Perceived stress (Quantitative)

- **Description:** The degree to which situations in one's life are appraised as stressful
- **Method of verification:** Average score on the PSS-scale before and after using the system
- **Target:** End users will decrease their level of perceived stress after using the system

2.2.7. Perceived quality of environment (Quantitative)

- **Description:** The degree to which the environment is perceived as comfortable
- **Method of verification:** Average score on the Environment scale before and after using the system
- **Target:** End users will increase their level of perceived environmental comfort after using the system

3. Planning of the pilot field trials

The Fit4Work system will be tested and validated within two consecutive stages of field trial.

In the **first stage of piloting an early prototype will be tested**. This first phase will be mainly explorative and will take place without a structured protocol and without the use of standardized questionnaires. This stage of validation will take two months. Every month the users’ feedback will be collected and presented in a feedback summary. This will result in an interactive cooperation between the process of technical development and the experience of end-users.

The aim of the **second stage is validation of the end solution**. Therefore its goal is to measure the project success in the Fit4Work system development, on the basis of the defined parameters of success (see paragraph 2.2). This second and final evaluation stage will take 1 month and take place according to a detailed protocol. Along the way, two interim reports will be delivered with results of the tested parameters.

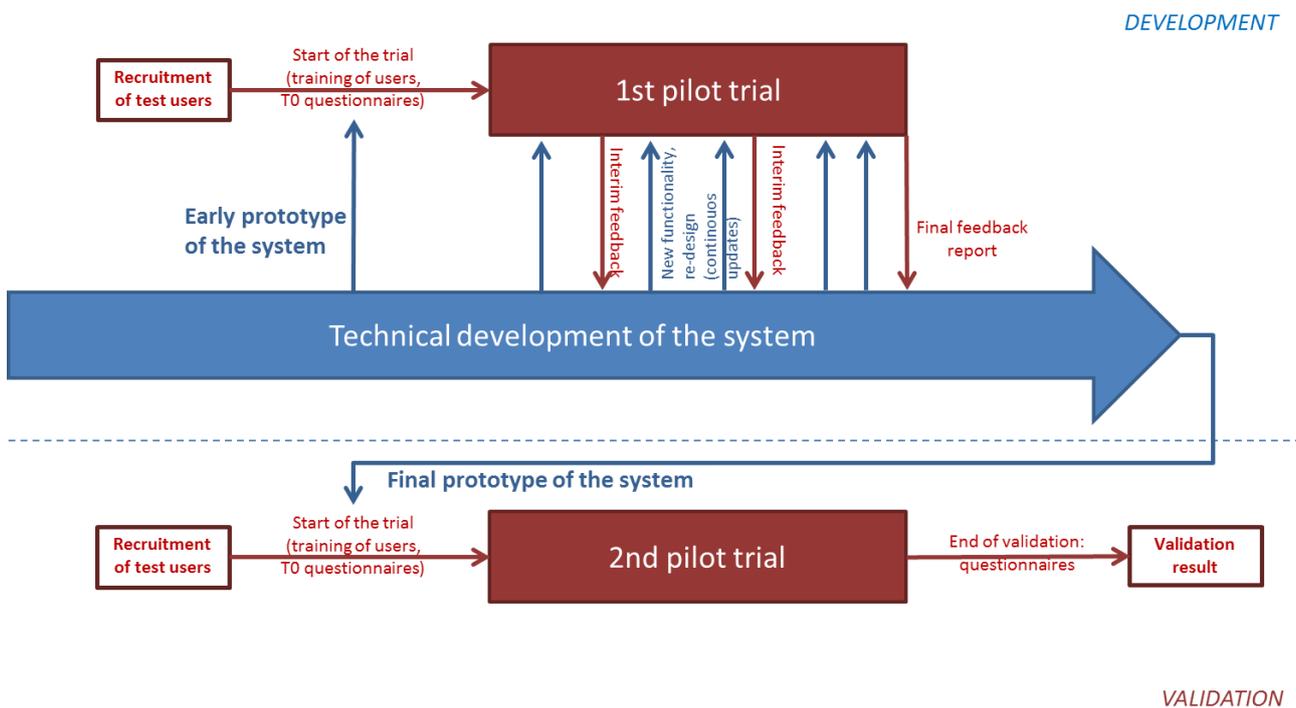


Figure 3.1. Planning of the Fit4Work pilot trials

4. First pilot trial: part of user-centric development

4.1. Aim

The aim of this first explorative stage of is to find the start-up problems of the Fit4Work system and to measure the user experience of the early prototype. Therefore the focus in this stage will mainly be on the usability, rather than on (quantitative) health and fitness outcomes. The findings of this early test stage will function as an input to the technical development of the system taking place in parallel to the field trial of the early prototype. Not only feedback concerning experience is gained, but it is also an advantage to getting more insight in desires of end-users. This phase and method of gaining information allow the developers of the system to receive valuable feedback which they are unable to receive when working only in the laboratory settings.

4.2. Setting

The trial in this first stage will take place in the Netherlands. For this trial a selection of 8 test-users was made. As Fit4Work focuses on persons aged 55 and up, with a paid or voluntary job (or other structural activities like providing informal care) in which they (may) experience (physical or mental) stress, the selection was based on those criteria. When someone's job mainly consists of desk activities, the focus will be on the right sitting posture, promotion of physical activity and prevention of mental stress; when a job primary includes physical activities, special attention will be paid on total body postures and lifting loads.

Table 1 Participants of first validation stage

Description of participant	Age	Location	N
Older adult with a desk job, executing office activities	55-65	The Netherlands (KBO-PCOB)	7
Elderly person with a voluntary desk job, executing office activities	65-75	The Netherlands (KBO-PCOB)	1
Total amount of participants			8

4.3. Recruitment of participants

Participants will be recruited among the members, elderly employees and their social network of KBO-PCOB. In the previous phase, a survey was distributed among the prospect users and filled in by 67 Dutch respondents, aged 50-75 years old. Several of them mentioned that they would like to stay involved in the project. Some of them also attended the focus group session, in which the users' preferences were discussed more in depth.

The approached persons that are interested in taking part in the field trials and meet the criteria will be selected to participate in the field trials. In the invitation, the procedures of the trials will be described (see Appendix), as well as the profiles of the preferred participants.

4.4. Protocol for testing

4.4.1. Planning

Date	Activity	Deliverable	T
March 2017	Recruitment of test-users early trials according to recruitment strategy		
May 2017	Start trials of the early prototype in the Netherlands: - Kick-off meetings with all participants with: * Introduction / training * Signing of Informed Consent * T0 Questionnaires		T0
June 2017	First feedback from test-users early trials	D2.5.1A	T1
July 2017	Second feedback from test-users early trials	D2.5.1B	T2
August 2017	Integration of feedback of early trials in final report	D2.5.1 Feedback from first cycle of validation	T4

4.4.2. Training

An introductory training will be organized to equip the test-users with the Fit4Work system before they start. This training will allow the participants to ask questions and to test whether the prototype works properly. The training will be organized by KBO-PCOB, which is in charge for test sessions. The trainer will be previously equipped with relevant instructions prepared by technical partners, as well as will undergo basic training on how to install and technically maintain the system.

4.4.3. Tools and Instruments for testing

As mentioned, this first stage of validation will take place without a structured protocol. Since the aim of this phase is to collect both data and clues for further development and research, the test-users need to get space to share their thoughts concerning any topic. Only several standardized questionnaires will be used to gather background information about the test-users.

The following instruments will be used in the first phase (in order in which they will be used):

- Questionnaire personal background characteristics (T0)
- Aptitude for usage Questionnaire (T0)

5. Second pilot trial: validation of the developed solution

5.1. Aim

The aim of the second stage of evaluation is to measure the success of the developed Fit4Work solution. This evaluation of parameters concerns only the layers that are related to the use(r), since this is investigated in the pilots. Parameters concerning innovation, business, dissemination and project management will be evaluated separately, since these are not directly related to the use of the product.

5.2. Setting

The pilots in this second evaluation stage will take place in two countries: the Netherlands and Poland. The system will be tested by 10 participants in the Netherlands and 10 in Poland. Because the aim is to test the system in a real life environment, the chosen setting was to test the system in how it is expected to be used: by people during their work. Because of the time limit and practical reasons, as many participants in one office were desired in which the participants had different functions and activities. Both participants with stationary as physical work activities were included.

5.3. Recruitment of participants

5.3.1. The Netherlands

As the amount of participants in the Netherlands was rather small, participants that meet the criteria were therefore easy to find. Through announcement in the organization different people showed interest in the project themselves. As for practical reasons participants were selected that worked nearby each other, so that a bigger group could take part of the test taking at once. Another notion was to include both stationary as physical work in the study.

5.3.2. Poland

The recruitment of pilot trial participant was done with the support of the Poznan City Hall. It was proposed to recruit pilot users from the community of nurses and professional caregivers working at elderly care homes maintained by the Poznań City.

5.4. Protocols for testing

5.4.1. Planning

Date	Activity	Deliverable
October 2017	Recruitment of test-users according to recruitment strategy	
November 2017	Start trials pilot in Poland and the Netherlands: - Kick-off meetings with all participants of three settings with: * Introduction * Training	

	* Signing of Informed Consent * T0 Questionnaires	
End November 2017	First feedback from test-users	D2.5.2A
Begin December 2017	Second feedback from test-users	D2.5.2B
End December 2017	Integration of feedback of pilots in final report and evaluation of additional success parameters	D2.5.2 Verification of the system against success parameters

5.4.2. Tools and instruments for testing

At the beginning of this pilot, the separate groups of participants in the pilot are invited for an introduction kick-off session. A presentation will be given about the project, the Fit4Work system and the pilot in which the test-users participate. Next to that, the participants get the opportunity to ask questions. In this introduction session, the participants also will be asked to sign an informed consent in their own language (see Annex A). After that, participants need to fill in the questionnaire (see Annex B for particular questionnaire tools to be used) and perform the Functional Fitness Test. In the end, the participants will receive the materials and will try out the system. They are asked to execute different tasks and to test the different functionalities of the system. Also, it is possible to contact the project leader when experiencing problems with the system.

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Annex A. Informed consent

The present document is composed in two sections, information sheet and declaration. The information sheet explains the activities that are going to take place today, and the statement – if signed- is your consent to participate in these activities. We invite you to read the document carefully and, if you need to, to ask for clarifications before signing it.

Information sheet

The data collection will be carried out by the staff of [insert research institution name] and particularly by [insert researchers' names] today [insert date] at [insert place] for the Fit4Work project.

The activity that constitutes this data collection is composed by:

- A questionnaire
- Doing a physical test

The data gathered (questionnaire, informed consent and video) will be archived, protected and handled by KBO-PCOB in compliance with the present information sheet, and under the European Union regulation on data protection (Directive 95/46/EC e 2002/58/EC). To access to the anonymous data and to the videos will be possible exclusively to the member of the Fit4Work project. The researchers commit to preserve your anonymity and the anonymity of other people or institutions to whom you might refer to during the data collection.

The research results will be made public through scientific papers, conferences and events with education purposes only.

The data collected will be used for research purposes and can be shared among the members of the Fit4Work consortium.

If you are interested in the research result – at the end of the study- you are free to contact Nora Ramadani.

Declaration

Name _____

Surname _____

ID _____

Date of birth _____

female male

The underwritten [insert participant's name] declares to have read and understood all the information written in this document and agrees to take part to the data gathering therein described on [insert date] operating at the vest of his/her abilities and truthfully answering to all questions.

(The refusal to underwrite this specific agreement impedes the participation in the data collection).

Date

Participant's signature

.....

.....

The underwritten [insert participant's name] accepts that his/her images extracted from the video-registrations are employed to illustrate the results of Fit4Work (The refusal to underwrite this second specific agreement does not impede the participation in the data collection).

Date

Participant's signature

.....

.....

Annex B. Evaluation tools

B.1. Baecke questionnaire for the evaluation of physical activity

1. What is your main occupation?

- Study 1
- Household 3
- Work 5

	Never	Seldom	Sometimes	Often	Always
2. At work I sit.. (5,4,3,2,1)	<input type="checkbox"/>				
3. At work I stand.. (1,2,3,4,5)	<input type="checkbox"/>				
4. At work I walk.. (1,2,3,4,5)	<input type="checkbox"/>				
5. At work I lift heavy loads.. (1,2,3,4,5)	<input type="checkbox"/>				
6. At work I am tired.. (1,2,3,4,5)	<input type="checkbox"/>				
7. At work I sweat.. (1,2,3,4,5)	<input type="checkbox"/>				

8. In comparison with others of my own age I think my work is physically.. (5,4,3,2,1)

Much heavier	Heavier	As heavy	Lighter	Much lighter
<input type="checkbox"/>				

9. Do you play sport?

- Yes No (go on to question 16)

10. If yes, which sport do you play most frequently? (1,3,5)

.....

11. How many hours a week? (1,2,3,4,5)

<1	1 to 2	2 to 3	3 to 4	4+
<input type="checkbox"/>				

	<input type="checkbox"/>				
12. How many months a year? (1,2,3,4,5)	<1	1 to 3	4 to 6	7 to 9	10 to 12
	<input type="checkbox"/>				

13. If you play a second sport, which sport is it? (1,3,5)

.....

	<1	1 à 2	2 à 3	3 à 4	4+
14. How many hours a week? (1,2,3,4,5)	<input type="checkbox"/>				

	<1	1 à 3	4 à 6	7 à 9	10 à 12
15. How many months a year? (1,2,3,4,5)	<input type="checkbox"/>				

16. In comparison with others of my own age I think my physical activity during leisure time is ... active (5,4,3,2,1)

	Much more	More	The same	Less	Much less
	<input type="checkbox"/>				

	Always	Often	Sometimes	Seldom	Never
17. During leisure time, I sweat.. (5,4,3,2,1)	<input type="checkbox"/>				

	<input type="checkbox"/>				
18. During leisure time I play sport.. (5,4,3,2,1)	<input type="checkbox"/>				

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	Never	Seldom	Sometimes	Often	Always
19. During leisure time I watch television.. (5,4,3,2,1)	<input type="checkbox"/>				
20. During leisure time I walk.. (1,2,3,4,5)	<input type="checkbox"/>				
21. During leisure time I cycle.. (1,2,3,4,5)	<input type="checkbox"/>				

	<i>(in minutes)</i>	<5	5 – 10	15-30	30 – 45	45+
22. How many minutes per day do you walk and/or cycle to and from work, school and shopping? (1,2,3,4,5)		<input type="checkbox"/>				

Scoring

If type of sport = 1 then intensity = .76 3 = 1.26 5 = 1,76	Simple Sport Score: Question 9-15 = (intensity*time*proportion)+ (intensity*time*proportion)=0/0.01-<4/4-<8/8-<12/12 0 is given to people who do not play sport.						
If number of hours a week =<1 then Time = .5 1-2 = 1.5 2-3 = 2.5 4-5 =3.5 >4=4.5	<table border="1"> <tbody> <tr> <td>Work index</td> <td>$(1+2+3+4+5+6+7+8)/8$</td> </tr> <tr> <td>Sport index</td> <td>$([9-15]+16+17+18)/4$</td> </tr> <tr> <td>Leisure time index</td> <td>$(19+20+21+22)/4$</td> </tr> </tbody> </table>	Work index	$(1+2+3+4+5+6+7+8)/8$	Sport index	$([9-15]+16+17+18)/4$	Leisure time index	$(19+20+21+22)/4$
Work index	$(1+2+3+4+5+6+7+8)/8$						
Sport index	$([9-15]+16+17+18)/4$						
Leisure time index	$(19+20+21+22)/4$						
If number of months a year = <1 then proportion .04 1-3 = 0.17 4-6 = 0.42 7-9 = 0.67 >9 = 0.92	<table border="1"> <tbody> <tr> <td>Total index</td> <td>Work index + sport index + leisure time index</td> </tr> </tbody> </table>	Total index	Work index + sport index + leisure time index				
Total index	Work index + sport index + leisure time index						

B.2. Perceived Stress Scale (PSS)

In the last month..	Never	Almost never	Sometimes	Fairly often	Very often
1... how often have you been upset because of something that happened unexpectedly?	<input type="checkbox"/>				
2... how often have you felt that you were unable to control the important things in your life?	<input type="checkbox"/>				
3... how often have you felt nervous and 'stressed'?	<input type="checkbox"/>				
4... how often have you felt confident about your ability to handle your personal problems?	<input type="checkbox"/>				
5... how often have you felt that things were going your way?	<input type="checkbox"/>				
6... how often have you found that you could not cope with all the things that you had to do?	<input type="checkbox"/>				
7... how often have you been able to control irritations in your life?	<input type="checkbox"/>				
8... how often have you felt that you were on top of things?	<input type="checkbox"/>				
9... how often have you been angered because of things that were outside of your control?	<input type="checkbox"/>				
10... how often have you felt difficulties were piling up so high that you could not overcome them?	<input type="checkbox"/>				

Scoring

	Never	Almost never	Sometimes	Fairly often	Very often
Q.1,2,3,6,9,10	0	1	2	3	4
Q.4,5,7,8	4	3	2	1	0

B.3. WHOQOL-BREF Questionnaire

1. How would you rate your Quality of Life?

Very poor			Very good		
1	2	3	4	5	
<input type="checkbox"/>					

2. How satisfied are you with your health?

Very dissatisfied			Very satisfied		
1	2	3	4	5	
<input type="checkbox"/>					

The following questions ask about **how much** you have experienced certain things in the last four weeks.

	Not at all		An extreme amount		
	1	2	3	4	5
3. To what extent do you feel that physical pain prevents you from doing what you need to do?	<input type="checkbox"/>				
4. How much do you need any medical treatment to function in your daily life?	<input type="checkbox"/>				
5. How much do you enjoy life?	<input type="checkbox"/>				
6. To what extent do you feel your life to be meaningful?	<input type="checkbox"/>				
7. How well are you able to concentrate?	<input type="checkbox"/>				
8. How safe do you feel in your daily life?	<input type="checkbox"/>				
9. How healthy is your physical environment?	<input type="checkbox"/>				
10. Do you have enough energy for everyday life?	<input type="checkbox"/>				
11. Are you able to accept your bodily appearance?	<input type="checkbox"/>				

12. Have you enough money to meet your needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. How available to you is the information that you need in your day-to-day life?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. To what extent do you have the opportunity for leisure activities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. How well are you able to get around?					
	Very poor	Poor	Neither poor nor good	Good	Very good
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				Very dissatisfied	Very satisfied
				1	2
				3	4
				5	
16. How satisfied are you with your sleep?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. How satisfied are you with your ability to perform your daily living activities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. How satisfied are you with your capacity for work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. How satisfied are you with yourself?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. How satisfied are you with your personal relationships?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. How satisfied are you with your sex life?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. How satisfied are you with the support you get from your friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. How satisfied are you with the conditions of your living place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. How satisfied are you with your access to health services?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. How satisfied are you with your transport?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SELF-MANAGEMENT OF PHYSICAL AND MENTAL FITNESS OF OLDER WORKERS

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25. How often do you have negative feelings such as blue mood, despair, anxiety, depression?

Never	Seldom	Quite often	Very often	Always
<input type="checkbox"/>				

Scoring

	Equations for computing domain scores	Raw score	Transformed scores*	
			4-20	0-100
Domain 1	$(6-Q3) + (6-Q4) + Q10 + Q15 + Q16 + Q17 + Q18$	=	b:	c:
Domain 2	$Q5 + Q6 + Q7 + Q11 + Q19 + (6-Q26)$	=	b:	c:
Domain 3	$Q20 + Q21 + Q22$	=	b:	c:
Domain 4	$Q8 + Q9 + Q12 + Q13 + Q14 + Q23 + Q24 + Q25$	=	b:	c:

*To convert raw scores into transformed scores, Table 4 in WHOQOL-Bref is used.

B.4. Perceived ambient conditions

		5	4	3	2	1
COMFORT FACTOR		Strongly agree				Strongly disagree
LIGHTING		<input type="checkbox"/>				
1.	The lighting is suitable and does not influence my posture	<input type="checkbox"/>				
2.	The lighting is too bright to work comfortably	<input type="checkbox"/>				
3.	The lighting is too dim to work comfortably	<input type="checkbox"/>				
4.	The computer monitor is placed so that light from windows and overhead lighting does not cause glare	<input type="checkbox"/>				
TEMPERATURE		<input type="checkbox"/>				
5.	The ambient temperature is comfortable	<input type="checkbox"/>				
6.	The temperature in the workplace does not fluctuate during a normal working day	<input type="checkbox"/>				
7.	The ambient temperature is too hot	<input type="checkbox"/>				
8.	The ambient temperature is too cold	<input type="checkbox"/>				
NOISE		<input type="checkbox"/>				
9.	The level of noise is comfortable	<input type="checkbox"/>				
10.	The level of noise does not affect concentration	<input type="checkbox"/>				
11.	The level of noise allows conversation and other communication without significant effort	<input type="checkbox"/>				
12.	There are sources of uncomfortable equipment noise	<input type="checkbox"/>				
AIR QUALITY		<input type="checkbox"/>				
13.	The air feels comfortable	<input type="checkbox"/>				
14.	The air circulation is comfortable	<input type="checkbox"/>				
15.	Warm air is not blowing directly into the workspace	<input type="checkbox"/>				
16.	Cold air is not blowing directly into the workspace	<input type="checkbox"/>				
17.	The air quality is satisfactory	<input type="checkbox"/>				
18.	The air is too dry	<input type="checkbox"/>				
WORK TYPE		<input type="checkbox"/>				
19.	Your work is mainly sedentary	<input type="checkbox"/>				
20.	Your work involves moderate physical activity	<input type="checkbox"/>				
21.	Your work involves intense physical activity	<input type="checkbox"/>				

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Scoring

Question	Score	
1	5 / 4 / 3 / 2 / 1	
2	1 / 2 / 3 / 4 / 5	reverse coding!
3	1 / 2 / 3 / 4 / 5	reverse coding!
4	5 / 4 / 3 / 2 / 1	
5	5 / 4 / 3 / 2 / 1	
6	5 / 4 / 3 / 2 / 1	
7	1 / 2 / 3 / 4 / 5	reverse coding!
8	1 / 2 / 3 / 4 / 5	reverse coding!
9	5 / 4 / 3 / 2 / 1	
10	5 / 4 / 3 / 2 / 1	
11	5 / 4 / 3 / 2 / 1	
12	1 / 2 / 3 / 4 / 5	reverse coding!
13	5 / 4 / 3 / 2 / 1	
14	5 / 4 / 3 / 2 / 1	
15	5 / 4 / 3 / 2 / 1	
16	5 / 4 / 3 / 2 / 1	
17	5 / 4 / 3 / 2 / 1	
18	1 / 2 / 3 / 4 / 5	reverse coding!
19	1 / 2 / 3 / 4 / 5	reverse coding!
20	5 / 4 / 3 / 2 / 1	
21	5 / 4 / 3 / 2 / 1	

B5. System usability scale

Strongly disagree → Strongly agree

	1	2	3	4	5
1.I think that I would like to use this system frequently.	<input type="checkbox"/>				
2.I found the system simple.	<input type="checkbox"/>				
3.I thought the system was easy to use.	<input type="checkbox"/>				
4.I think that I would not need the support of a technical person to be able to use this system.	<input type="checkbox"/>				
5.I found the various functions in this system were well integrated.	<input type="checkbox"/>				
6.I thought there was much consistency in this system.	<input type="checkbox"/>				
7.I would imagine that most people would learn to use this system very quickly.	<input type="checkbox"/>				
8.I found the system very cumbersome to use.	<input type="checkbox"/>				
9.I felt very confident using the system.	<input type="checkbox"/>				
10.I could use this system without learning new things.	<input type="checkbox"/>				

Scoring

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
All questions	1	2	3	4	5