

Motivate and assist
elderlies' exergaming-based
resistance training by
a cyber-physical systems

APPENDIX



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APPENDIX-A-ABOUT BRIEF INTERVIEW

1. Brief interview for selecting focused active leisure activities

- Material 2-3

2. Brief interview for selecting focused type of resistance training

- Material 4

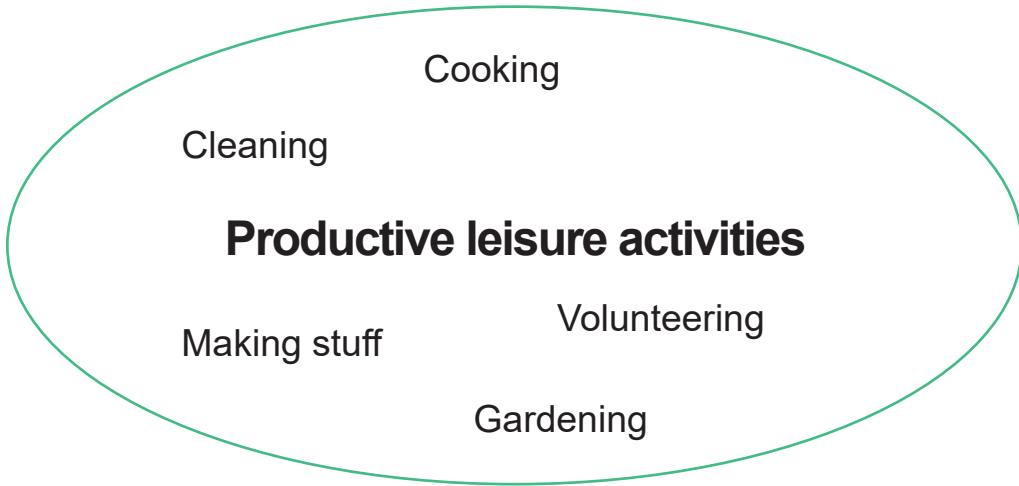
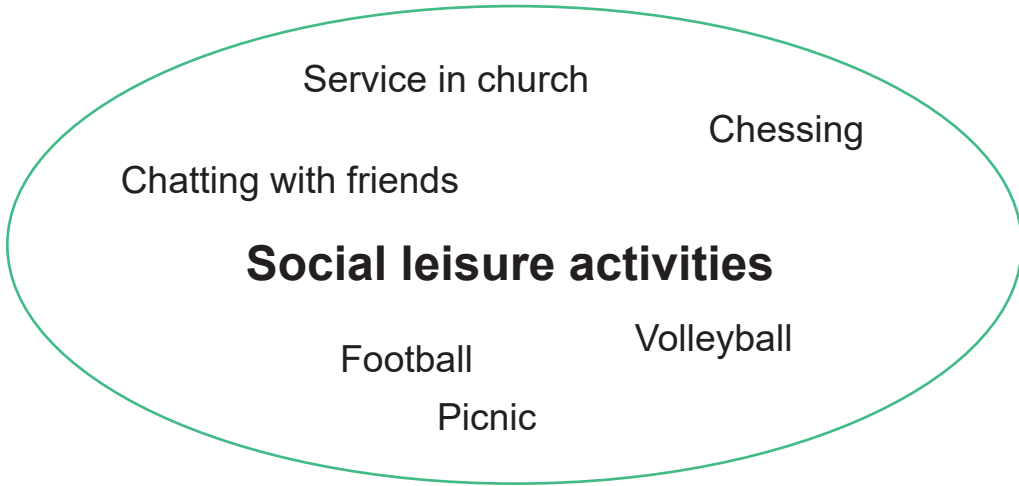
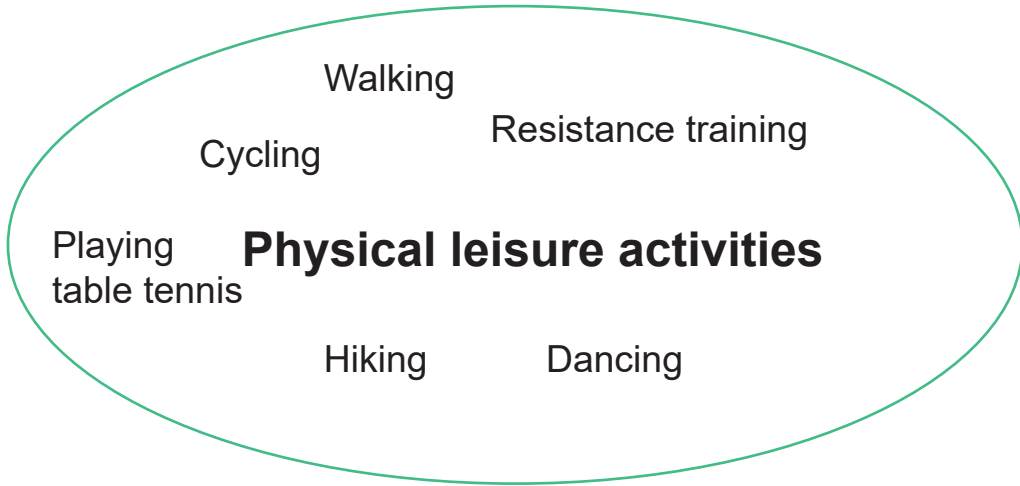
1. Brief interview for selecting focused active leisure activities

1 Materials

Important Benefits	Relevance to ALAs	Typical type of ALAs for elderly older than 75
Slow down decline of cognitive functions,		
Slow down decline of physical functions,		
Enhance self-efficacy&-self-satisfaction,		
Enhance social connection,		
Reduce risk of depression,		
Reduce healthy risk in later life.		

- Respondents can also fill other benefits in 1st column of the table
- Respondents score the level of relevance using 1, 2, 3.
- Respondents fill the type of leisure activities which can bring the benefits (They can propose the activities themselves or select activities written on the paper)

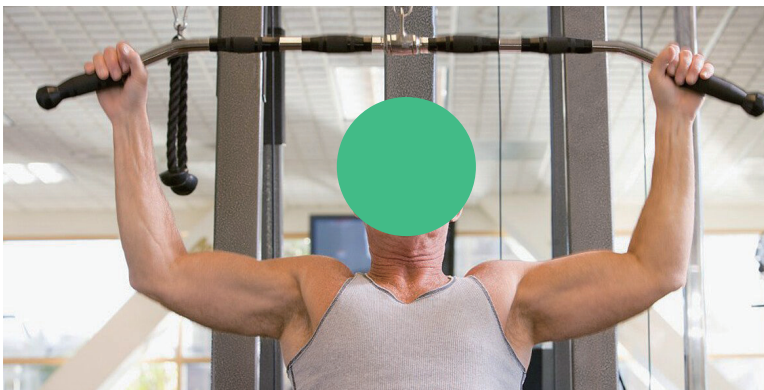
1 Weakly relevant to ALAs 2 Relevant to ALAs 3 Relevant to ALAs



2. Brief interview for selecting focused type resistance training

1 Materials

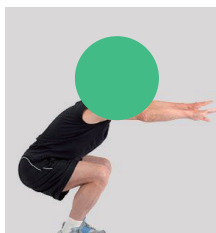
There are four types of resistance training shown below, can you tell me which type of resistance training suits the elderly (above 75) the most?



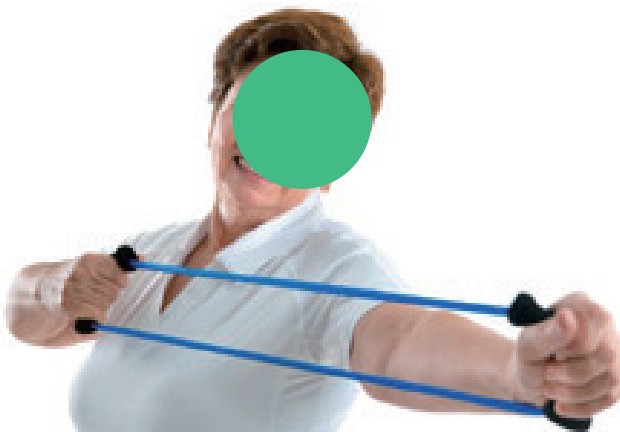
Machine weight training



Free weight training



Body weight training



Elastic band training



Fold-away gym



APPENDICE-B-ABOUT FOCUS GROUP INTERVIEW

1a.Focus group interview with target group-1st round

- Materials 6-7
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2a.Focus group interview with personal trainer-1st round

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- Materials C-Matrix for voting 18
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1a-Focus group interview with target group - 1st round

1 Materials

Introduction

Kick off

Hi everyone, thank you for helping me to do this interview. As we talked before this interview, you do have experience in resistance training both at gym and home, however, you do not perform sufficient training. Through this interview, I would like to obtain some information considering the obstacles, issues which possibly hold you back from doing resistance training. If you can hardly recall your issues, that is fine, I will offer you some issues found from either website or literature in order to evoke your memory.

Procedures

- 14:00-14:05 ----- Warm up
- 14:10-14:30 ----- Ask questions about participation issues
- 14:30-14:35 ----- Summary
- 14:35-14:40 ----- Break
- 14:40-15:00 ----- Ask questions about performance issues
- 15:00-15:10 ----- Summary & close

Interview Guide

Kick off

1. Where do you usually perform your resistance training? (Gym, home, or someone else)
2. Why do you usually choose to do in that place?
3. What do you expect from your training?

Participation issues

1. What issues may hold you back from doing resistance training?
2. What issues may make you leave your resistance training?
3. What difficulties do you encounter in participating you training?

Performance issues

1. What difficulties do you usually encounter when you are performing your resistance training?
2. What things do you find annoying or uncomfortable when you are performing your resistance training

Attitude towards the findings from LR

1. To what extend do you think the problems on this paper apply to you?

Participation issues

Intrapersonal issues

- Lack of interest in resistance exercise,
- More interested in other physical activities,
- Strength training is too strenuous,
- Low outcome expectations,
- Lack of time
- Unenjoyable training experience
- Low motivation,

Interpersonal issues

- Lack of social support from trainers and peers,
- Exercise companion quitted,
- No continuation of instructor's supervision,

Environmental issues

- Financial cost is too high
- Seasonal reasons (Bad weather),
- Lack of access to a fitness center,
- Fitness centers are too busy,
- Uncomfortable feeling in fitness center,

Participants were allowed to choose the issues from the paper shown on the left if they can hardly come up the issues themselves.

2 Feedback collection&evaluation

What issues do you have when it comes to participate and perform resistance training?

Code	Definition	Quote
Bad weather	Windy and rainy day	I don't go outside in rainy day unless it is really necessary
		I am afraid of falling, strong wind may make me fall
	Rather stay at home if the weather is cold and wet	I rather stay at home during the winter, of course I went to Kingdom hall twice a week, there is a brother usually pick me up.
		My leg hurts when I go out in winter or when the weather is wet.
More interesting activities	Yoga lover	I am yoga believer, I do yoga at least 4 times a week.
	Other interesting alternatives	I am busy with the services in the kingdom hall
		I spend a lot of time on knitting.
Unenjoyable training experience	Boring training experience	Weight training is boring because you have to do the same exercise repetitively
		I agree that the training is boring, I try to lift my small dumbbell when I was watching TV. But my attention was totally on TV programme.
		I choose to do spinning because I can have conversation with my friends at the same time. But when you are lifting weights, that is not possible

Code	Definition	Quote
Poor training quality	Insufficient supervision from trainings	I do not have many communication with trainers, they usually have other client who paid extra money
		Yeah, Trainers do not give enough guidance. They are always busy with something. Of course, they can come to help you, but only, may be 5 minutes.
		I agreed that we, as clients, need more attention from our trainers. They give us training plan, but the plan is not necessarily suitable for us.
Low motivation	No peers or peers give up	I used to do exercise with a sister, but she got dementia several years ago, so I also stopped. If I got a new friend to do it with me, I will do it again.
		None of my friends at my age go to gym, so I do not want to go to gym alone.
	The purpose at gym is not training	I talk to people at gym, trainers, other people I know, haha.....I rarely lift weights. A bit too boring.
Unenjoyable training environment	Sweat in the air	I don't like the body odor in the gym.... The sweat makes me uncomfortable.

3 Findings

- 3 respondents mentioned that bad weather may hold them back from going to gym.
- 3 respondents reflected that they have something which is more interesting than resistance training.
- 3 respondents reflected that they feel bored when they are performing resistance training.

- 3 respondents reflected that low motivation could be the reason for the low adherence to resistance training.
- Interestingly, one respondents mentioned that body odor in gym make her uncomfortable.

2a-Focus group interview with Personal trainers-1st round

1 Materials

Introduction

Opening

Hi everyone, thank you for helping me to do this interview. Through this interview, I would like to collect some information considering the obstacles, issues which possibly hold your elderly clients back from doing resistance training. I want to mention that the clients should be older than 75 years old

Procedures

- 14:00-14:05 ----- Warm up
- 14:05-14:30 ----- Ask questions about participation issues
- 14:30-14:35 ----- Summary
- 14:35-15:00 ----- Ask questions about performance issues
- 15:00-15:05 ----- Summary & close

Research Guide

Kick off

1. What age group in your elderly clients are the least active in resistance training participation?

Participation issues

1. What issues may hold your elderly clients back from doing resistance training?
2. What issues may make your clients leave their training?
3. What difficulties do your clients usually encounter in participating in your training?

Performance issues

1. What difficulties do you usually encounter when you are performing your resistance training?
2. What things do you find annoying or uncomfortable when you are performing your resistance training?

Attitude towards the findings from LR

1. To what extent do you think the problems on this paper apply to you?

Participation issues

Intrapersonal issues

- Lack of interest in resistance exercise,
- More interested in other physical activities,
- Strength training is too strenuous,
- Low outcome expectations,
- Lack of time
- Unenjoyable training experience
- Low motivation,

Interpersonal issues

- Lack of social support from trainers and peers,
- Exercise companion quitted,
- No continuation of instructor's supervision,

Environmental issues

- Financial cost is too high
- Seasonal reasons (Bad weather),
- Lack of access to a fitness center,
- Fitness centers are too busy,
- Uncomfortable feeling in fitness center,

2 Feedback collection & evaluation

Code	Definition	Quote
Bad weather	Rainy and cold day hold elderly back	<p>The people is usually much less in rainy day</p> <p>I train elderly, we have a programme for people older than 65. Many clients just stay at home if it is rainy or cold outside</p>
Fear of pain	Some elderly give up because they are afraid of pain	Some elderly are afraid of pain, joint pain, or muscle pain, when they are doing exercise. So you know, some elderly tried once or twice, then, they never come back again.
Limited communication	Elderly should have more communication with their trainers	<p>I think clients need to have more communication with us. To tell us how they feel. Or,,you know.....if they do not know how to use the equipment, they should ask.</p> <p>Yeah, we sometimes approach them, then they tell us their problems. But we have so many clients, you know.....we have no idea who has problems, who do not if you don't ask.</p> <p>Of course, we can see if they are doing the exercise correctly or not, but we have no idea if you are comfortable with exercises or not.</p>

Unenjoyable training process	The adherence is not as high as expected, unless the training process is enjoyable	<p>You have to do.....um.....the same motions repetitively, that is not interesting.</p> <p>Yeah, younger people have fantasy..... to become a tough guy, superman. This is a good motivation, haha. Elderly.....you know, if they don't feel joyful.....yeah....enjoyable, they don't try it again.</p> <p>Many elderly clients just come twice or three times.....um.....they don't appear again. Or sometimes appear if their friend also come to the gym. They talked a lot, some do not come for training.....haha,</p>

3 Findings

- Rainy, cold day may hold elderly back from gym.
- All of the trainers reflected that communication is very important. Clients should tell their feeling and confusion during training. Otherwise the training quality can hardly guarantee.
- Younger man have fantasy to become tough guy, but elderly can hardly persist unless the process is enjoyable.
- Fear of pain may reduce elderly's adherence to training.

1b-Focus group interview with target group/trainers - 2nd round

1 Materials A-Introduction

Introduction

Opening

Hi everyone, thank you for helping me to do this interview. Last time, we talked about elderly's issues and obstacles which may hold them back from participating and performing resistance training. Today, I would like to talk about the needed services for addressing these issues and obstacles.

Procedures

- 14:00-14:10 ----- Warm up
- 14:10-14:40 ----- Selecting services for enjoyment
- 14:40-14:45 ----- Summary
- 14:40-14:50 ----- Break
- 14:50-15:10 ----- Questions about services for improving enjoyment
- 15:10-15:15 ----- Summary & close

Interview Guide

For improving training quality

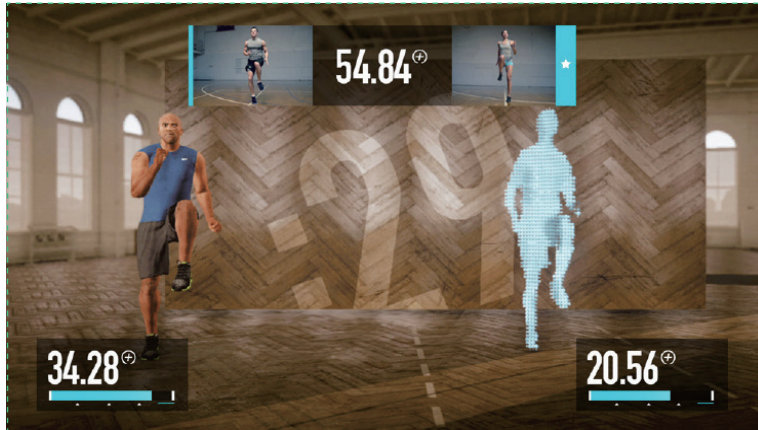
- What services shown on this paper may contribute to improve you/your clients training quality?
- Do you have something to add?

For increasing motivation

- What services shown on this paper may contribute to increase you/your clients level of motivation?
- What services shown on this paper may contribute to increase you/your clients level of enjoyment?
- Do you have something to add?

2 Materials B-Services

The potential services for enhancing your motivation



- Give score
- Give feedbacks

https://www.youtube.com/watch?v=CoM_MN-Z5pzU



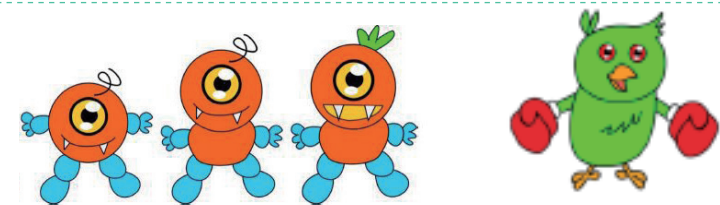
- Give score
- Give motivational message

<https://www.youtube.com/watch?v=aDU9NkhsSk8>



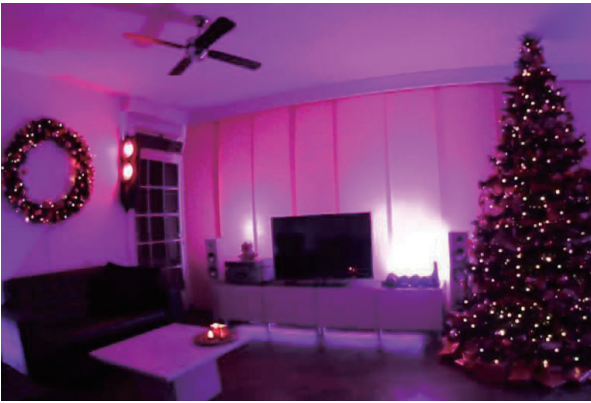
- Enabling online competition

<https://www.youtube.com/watch?v=5OSQt-MP7Wj0>



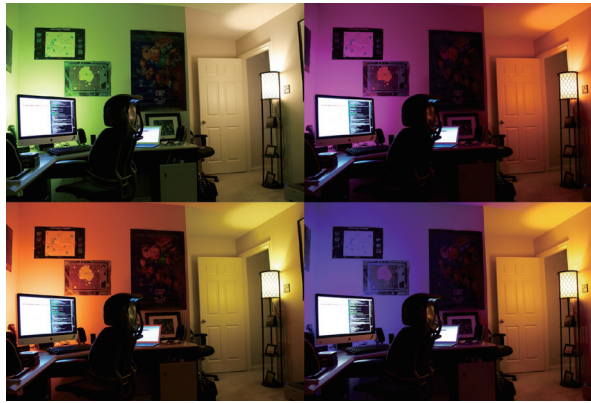
- Training lead to the growth of characters,
- Absence of training make characters shrink
- The characters can fight with each other,

The potential services for increasing enjoyment



Adjusting your indoor lighting

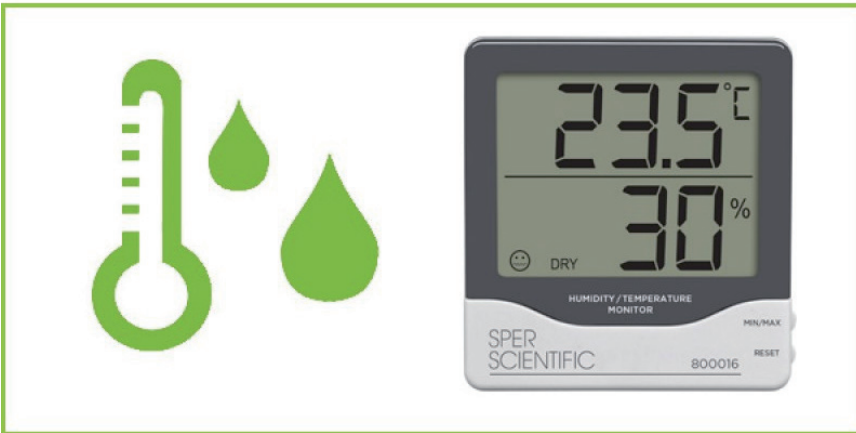
<https://www.youtube.com/watch?v=3BJVTypIMI4>



Changing the color of lighting



Changing brightness of lighting



Adjusting indoor temperature and humidity

The potential services for improving your training quality



Beast sensors

Count repetitions, sets

Measure velocity

<https://www.youtube.com/watch?v=Fp0DVT55akQ>



Providing training plan based on objective

<https://www.youtube.com/watch?v=RvjuScPbsA4>



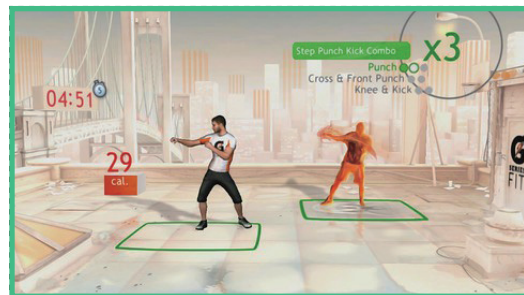
- Mimic trainer's motions
- Give feedback (To tell users that his/her motions are wrong)

https://www.youtube.com/watch?v=CoM_MNZ5pzU

Muscle activities monitoring

Provide feedback

Monitoring t muscle activities



Show the training plan on the screen (Repetitions, sets,)

<https://www.youtube.com/watch?v=zEH5ek3j7N8>



Exercise recommendation

https://www.youtube.com/results?search_query=Gymwatch

3 Materials C-Matrix for voting

A-Please vote the services that may effectively motivate you.

Interventions	Vote
Giving scores	
Giving Motivational message	
Showing shrinking avatar	
Showing growing avatar	
Enabling competition between avatars	

B-Please vote the services that may effectively increase your level of enjoyment.

Interventions	Vote
Changing color of lighting	
Changing brightness of lighting	
Changing the indoor temperature	
Changing the indoor humidity	
Providing the music when you are training	

C-Please vote the services that may contribute to improve your training quality

Interventions	Vote
Counting reps, sets, velocity	
Mimicing trainers' motions	
Providing training plan based on objective	
Visualizing training plan on screen	
Providing feedback to inform users their training quality	

4 Feedback collection&evaluation

Feedbacks from target group-services for increasing motivation and enjoyment

Code	Definition	Quote
Music is an effective way for increasing enjoyment	Music could increase the level of enjoyment, but also could be distracting	Music can make me feel enjoyable, indeed.....
		If you listening the music for too many times... the music may make no difference.
		Some music make me feel excited, but some music are distracting. Depends on the music, rock is not my preference, for example.
Motivational message could be useful	Motivational message remind elderly that their training is meaningful	The message is quite useful. It allows me to know what I am doing is correct and meaningful. This encourage me to do more training.
		Yeah I agree. We need people to tell me that I am on the right track.....
	Growing avatar can be a good motivational message	The growing avatar is interesting. It is our accomplishment, right?
		It makes us feel our training is not just for our own health, or, yeah, well being, but also for someone else.

Code	Definition	Quote
		I like the avatar as well. It is like someone I take care of.
Lighting is necessary	The adjustment on lighting is necessary	Of course, bright light can make me feel better in rainy day.
		Yeah, I likelighting....adjusting. Brighter, darker, depends on the differenweather. Yeah, if that's possible, why not?
Uncertain effect of T&H	The effect of T&H on enjoymentcan hardly be judged	I can not judge the effect of temperature and humidity. Maybe in summer.....the indoor temperature should be lower?...I don't know
		Yeah, it is.....um, abstack. so I can not judge if it is necessary.
Preferably being contributor	Avatar is nice, but elderly prefer being contributors to being competitors.	I want to do something for others
		Yeah, but I, personally, prefer, may be contribute my effort to the community, or other people. not being competitors.
		Yeah, several avatars can have.....what so called?.....Cooperation.

Feedbacks from target group-services for improving training quality

Code	Definition	Quote
Repetitions, sets counting	Repetitions and sets should be accurately counted	I can hardly remember how many repetitions I lifted. So it is good if someone count it for me.
		I like talking. But several times, when I go back to my training, I just forget how much training I have done.
		I also think the repetitions, sets should be... counted and also.....recorded.
Feedbacks is necessary	Feedbacks can tell people if their motions are correct	Yeah, I expect some guidance from trainers.
		Guidance is necessary if.....um.. you know...I do not have to pay extra money.
		We need trainers to tell us our mistakes, otherwise, we can not realize it.
Providing training plan	Training plan is the main reason for why people need trainer.	Of course, that is what I paid for
		Trainers give training plan based on.....your objective? Yea, objective, what do you want to achieve through training. Then some tests. They test what you can do
		And your stamina, your muscle strength. something like that.

Code	Definition	Quote
Feedbacks is necessary	Feedbacks can tell people if their motions are correct	<p>Yeah, I expect some guidance from trainers.</p> <p>Guidance is necessary if.....um.. you know...I do not have to pay extra money.</p> <p>We need trainers to tell us our mistakes, otherwise, we can not realize it.</p>

Code	Definition	Quote
Mimicing trainers motions	Mimicing trainers motions indiate what should be done	<p>Following a digital trainers is quite interesting. I have never done that before.</p> <p>I like to be told what to do.....I just follow it</p> <p>It would be good if I can follow the trainer. Is the training going to stop if I stop?</p>
Visualized training plan	Visualize training plan can tell what have be done and what will be done.	<p>I can check this if I forget to count my repetition, I like this</p> <p>Yeah, this programme can help me to complete my training.</p> <p>This is useful, I agree.</p>
Avoid wearable device	Wearable device is uncomfortable	I am not sure if I have to wear this belt on my arm. It seems very uncomfortable
More concern from trainers	Trainers should ask about clients feeling	I think.....trainers should give their clients more concern. Ask clients how they feel
Audio and visual message	The format of message should be dependent on trainers	I am not sure if I can read the visual message on screen

Feedbacks from target group-services for increasing motivation and enjoyment

Code	Definition	Quote
Score is useful	Earning score can be a motivation in a short term	<p>Getting score is nice, but I can hardly tell if scores can really make me participate more resistance training.</p> <p>Yeah, what can I do with the score? May be I can tell people that.....I earned more score than they have earned?</p> <p>This is important, if we can use the score to do something, I may have motivation to earn the scores.</p>
Adjustment on temperature and is necessary	Adjusting temperature and humidity can increase clients' attendance	<p>Yea, why not, the temperature should be controlled to make our clients more comfortable</p> <p>Yea, controlling temperature is quite necessary</p>
Providing enthusiastic music	Enthusiastic music to cheer clients up	<p>You know what, we usually play the music to cheer our clients up. So music is important at a gym</p>
Motivational message are useful	Motivational message can be useful, but people always expect something new	<p>The message is encouraging when people hear it the first time.</p> <p>But it is not useful any more if people hear the same message several times.</p> <p>People like to hear something new, you know.</p>

Code	Definition	Quote
Lighting is necessary	Brighter lighting are needed in rainy and cloudy day,	<p>Lighting should be brighter at night, obviously.</p> <p>I am not sure how bright is the best, but bright light can make your....gym, the training environment more comfortable at night or in cloudy day,</p>
Competition between avatar is motivational	Competitors can keep long-term motivation	<p>This is interesting. Why not, the competition with other avatars is a good motivation. You try to grow faster than other people.</p> <p>I think someone would like this.</p>

Feedbacks from target group-services for increasing motivation and enjoyment

Code	Definition	Quote
Giving feedback	Giving feedbacks to correct motions	Yeah, clients need us to remind them, otherwise they can not realize...um...they are doing wrong.
		Some clients have very little communication with us, so they can hardly realize their mistake.
		Communication is very important when you are at gym. Otherwise you can not get help from us.
Training plan should be arranged	Training plan should be arranged by trainers based on objective and physical conditions	Clients have to give us their objective at first, then we assess their cardiac function and physical capabilities and many other things.
	Training plan should be regularly adjusted	Clients' plan should be changed regular. It depends on their changed physical conditions and objective.
Mimicing trainers motions	Mimicing motions can push elderly to continuously perform the training.	Following trainers may keep people from distraction.
Inquiry are needed	Inquiry are needed to ask about how he/ she feel in the process of training	I agree users need more concern, especially senior.
	Trainers should approach users to give concern (Although it is not realistic)	We approached them when we see they hadhard time. Their face can tell

Code	Definition	Quote
Repetition, sets and velocity should be accurately measured	Accurately measure sets, reps and velocity	The repetitions should be counted, otherwise you can not know.....if you have completed the training or not
Fatigue should be avoided.	Fatigue should be avoided during training	What situations should be avoided? Well, that is a good question. I think, may be, fatigue, muscle strain, or overtraining.....many things. Especially fatigue. You should stop when you feel fatigue.
Easy way of assessing physical conditions	Physical conditions can be assessed easily by evaluating the accuracy of users motions	Of course, there is many ways to evaluate your muscles. But there is an easy way to find out your weak muscle. For example, I ask you to lift a small dumbbell for, for instance, 5 times. If your arm are weak, your motions can not be very accurate.
Home-based resistance training	Home-based resistance training is an option when the weather is bad and elderly do not want to go outside.	<p>Training at home is OK. if they do not want to go out. Lifting their small dumbbell, for example. But it would be better to come here, we can give some suggestions to them.</p> <p>Yea, as you(author) said, users expect more support from us, they can at least get some help from here, better than nothing.</p>

APPENDICE-C-ABOUT CONCEPT SELECTION

1. Material-A-Introduction	28
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Concept selection session

1 Materials-A-Introduction

Introduction

Kick-off

Hello, thank you for coming. In last few weeks, I generated three concepts which is for improving and motivating elderly's resistance training using intelligent technologies. So in this session, I want to invite you to select the best concept from the three. In the meanwhile, you can also choose the functions which is included in unselected concepts. I hope that the selections should be based on the following six criterias:

Criterias

- **C1-Perceived usefulness**

The functions of this system can effectively contribute to improve elderly's training quality, increase enjoyment as well as enhance motivation.

- **C2- Necessity**

The problems/issues addressed by this concept can hardly be addressed by human.

- **C3- Originality**

The services provided by the system are different from and superior to those you have seen/used before.

- **C4- Ease of use**

The usage of the concept is easy to understand and requires only brief guidance or tutorial to handle it.

- **C5- User friendliness**

Users can come across the system with pleasant and low pressure.

- **C6- Unintrusiveness**

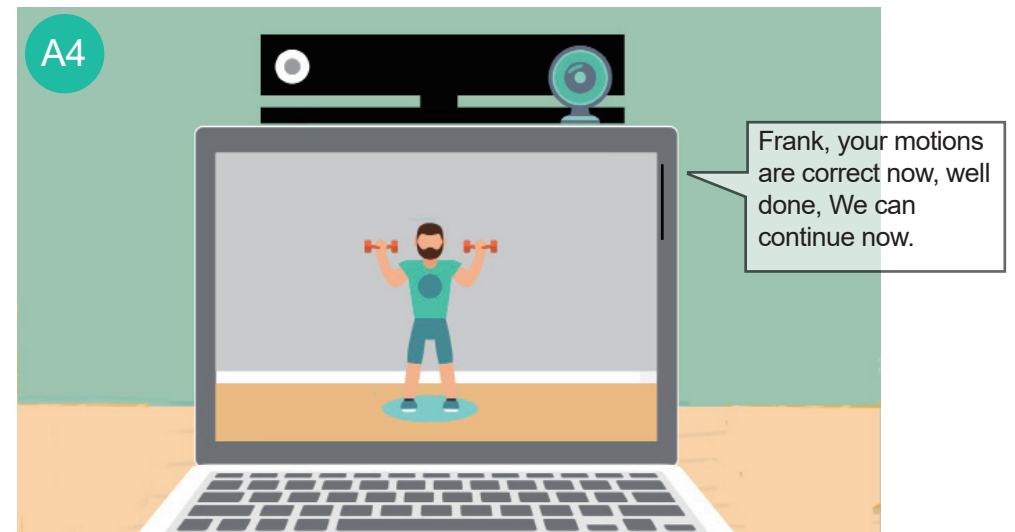
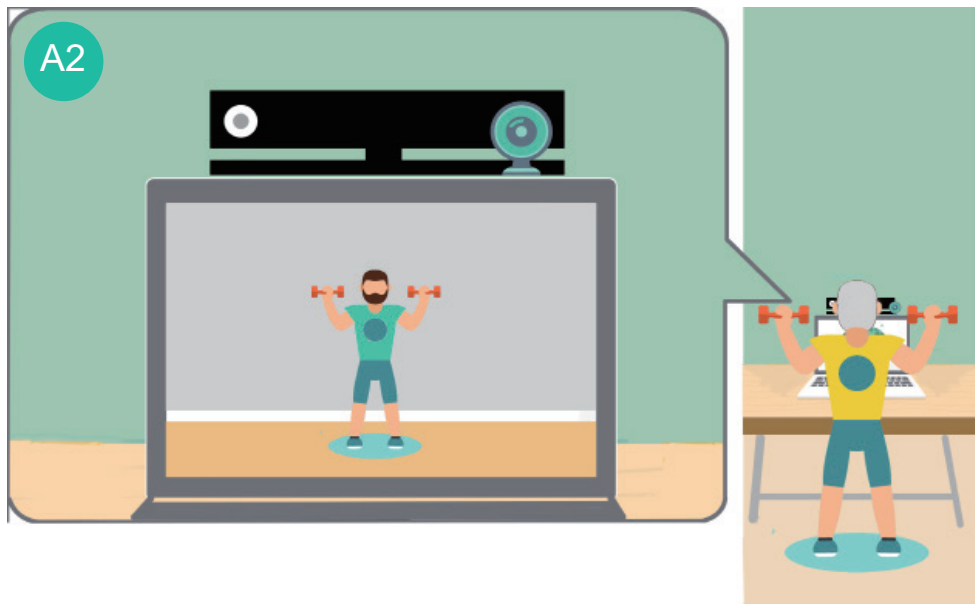
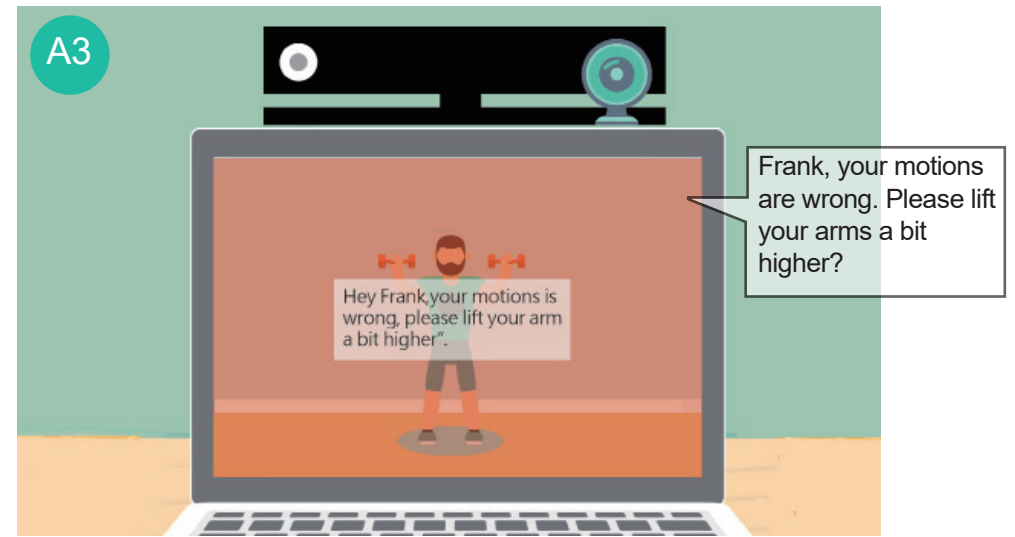
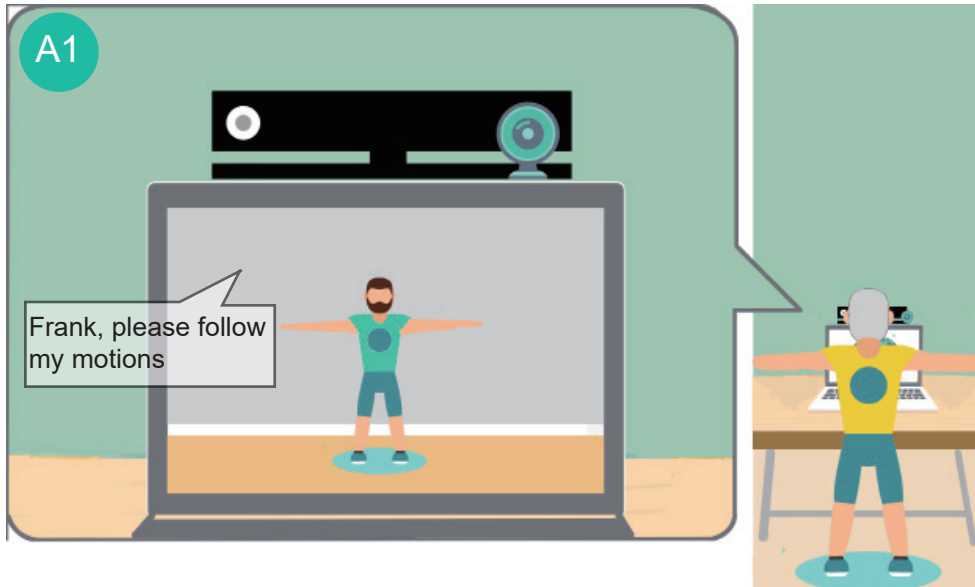
The service provided by the system is not intrusive

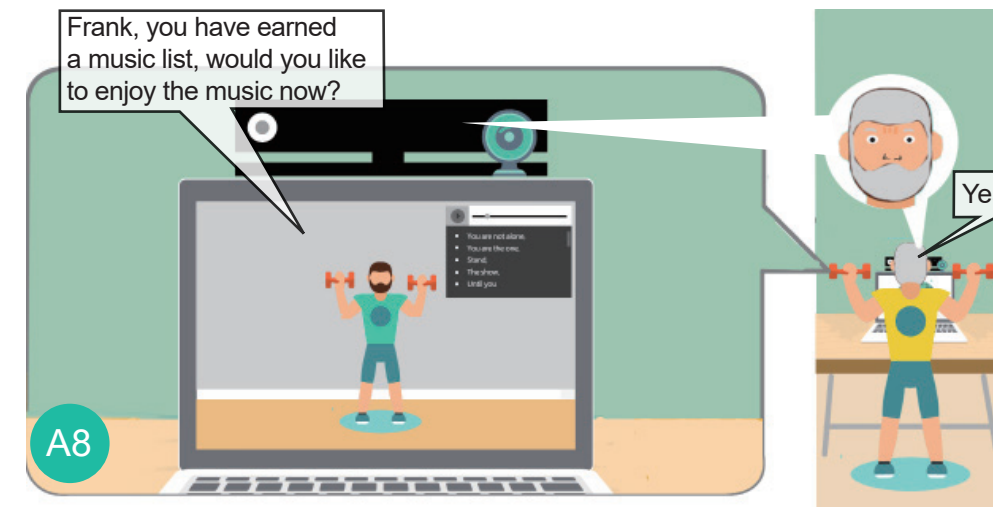
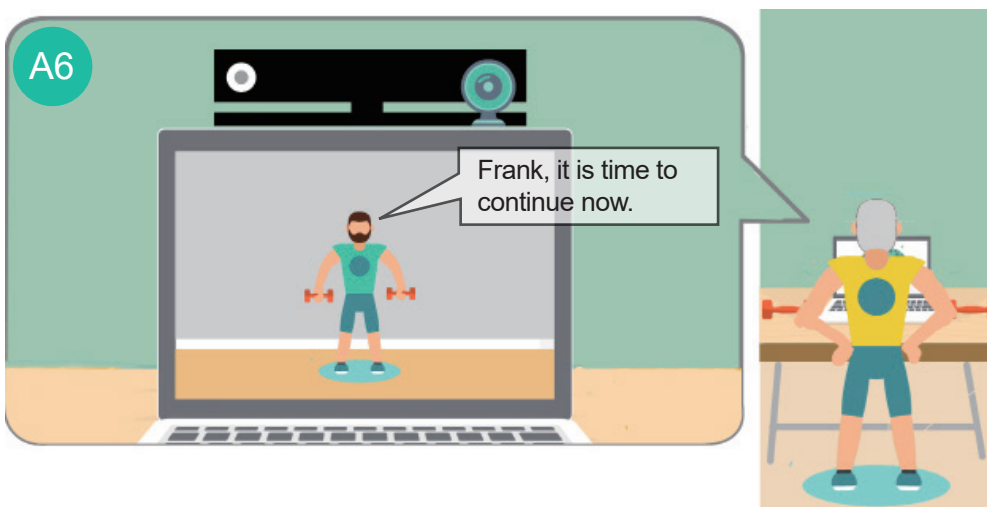
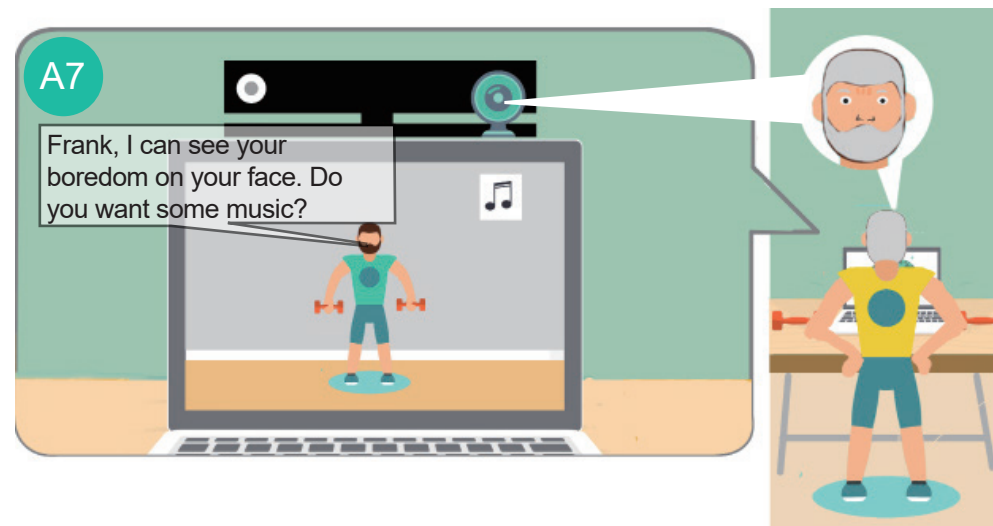
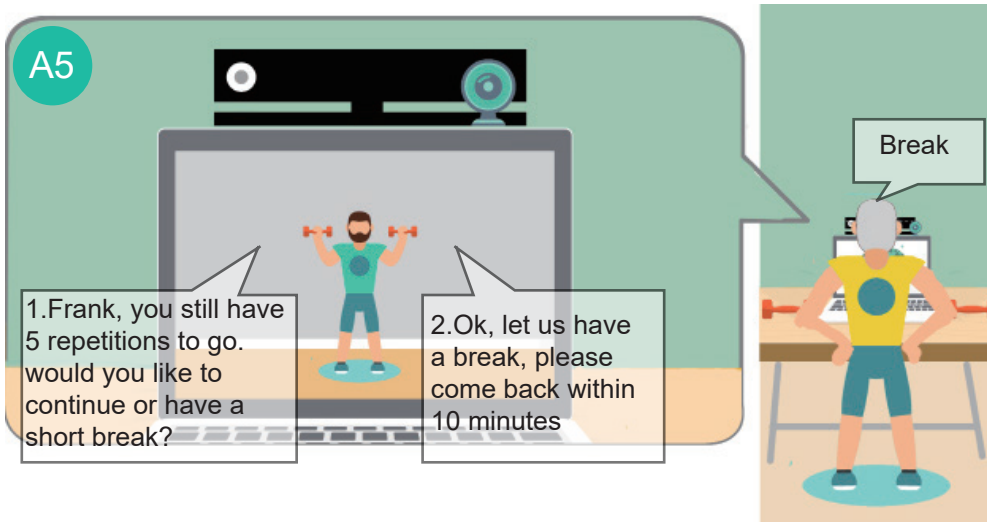
Harris Profile Matrix

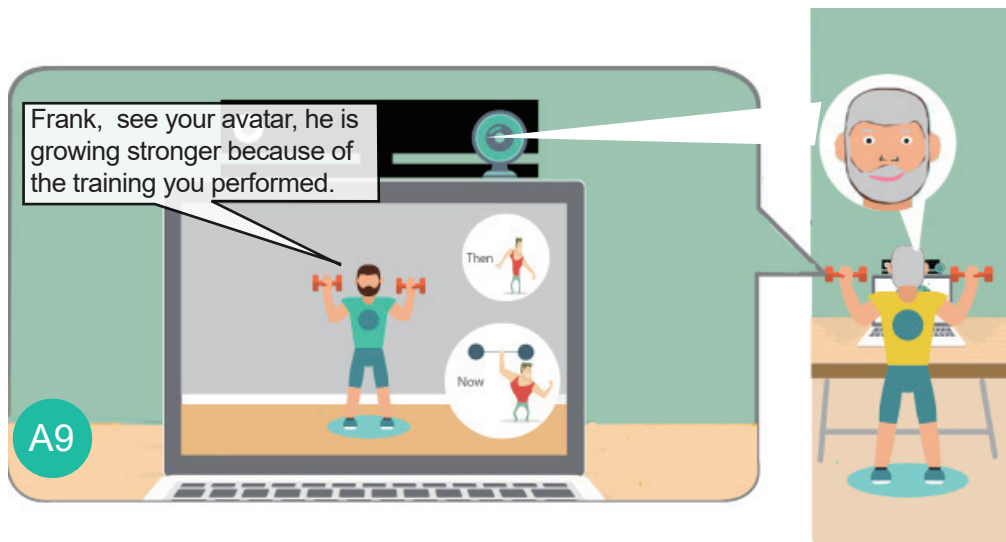
	Concept one				Concept two				Concept Three			
	1	2	3	4	1	2	3	4	1	2	3	4
Perceived usefulness												
Necessity												
Originality												
Ease of use												
User friendliness												
Unintrusiveness												

2 Materials-B-Three concepts

Concept one-Your training manager

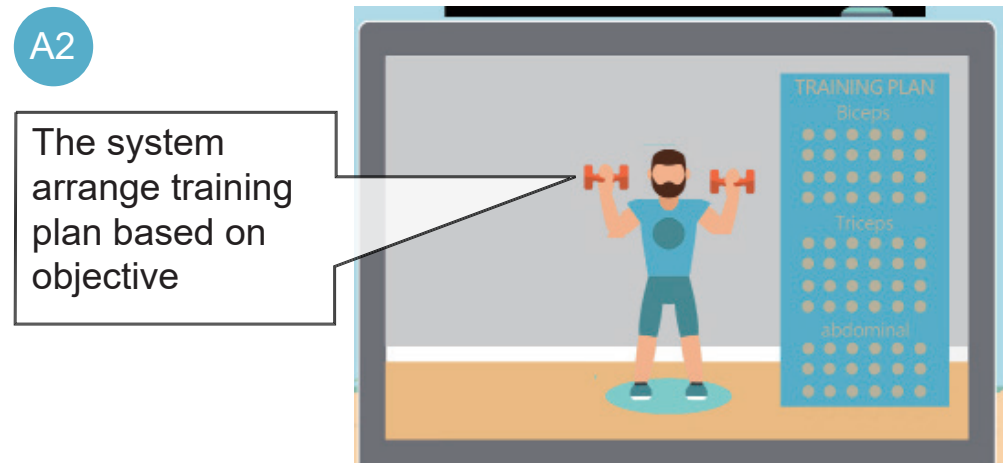






A9

Frank, see your avatar, he is growing stronger because of the training you performed.

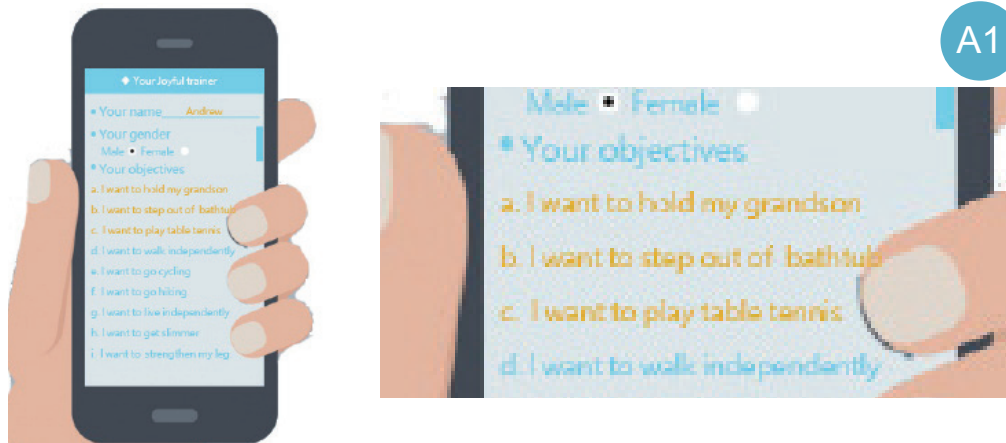


A2

The system arrange training plan based on objective

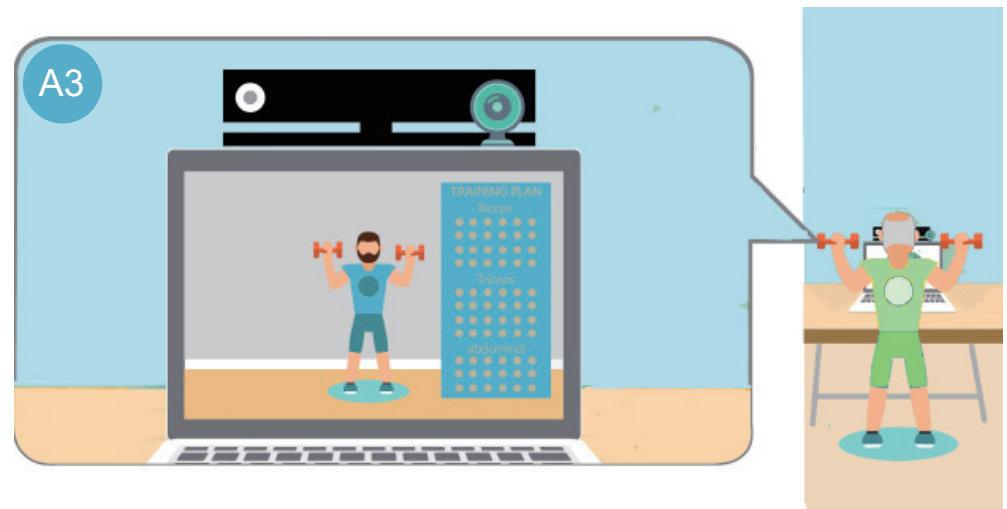
- Arrange training plan based on objective

Concept two-Your training manager



A1

- Type in objective through mobile phone



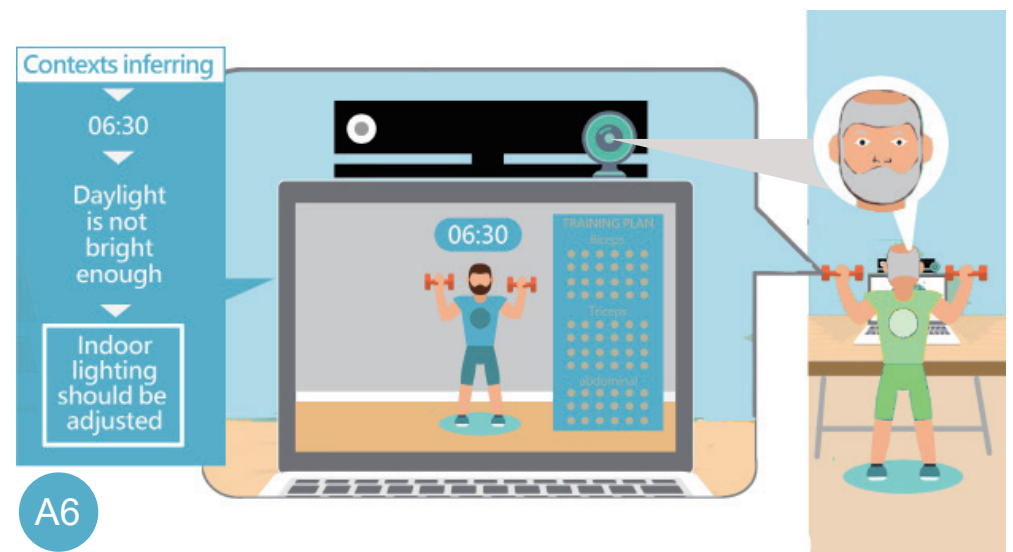
A3

- User follow the motions of trainers



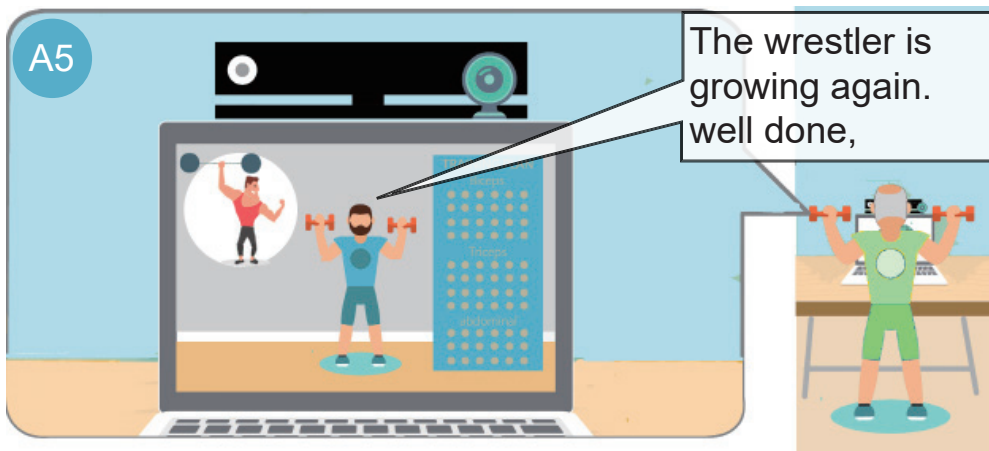
A4

- Trainer tells user his motions is wrong



A6

- The lighting should be adjusted



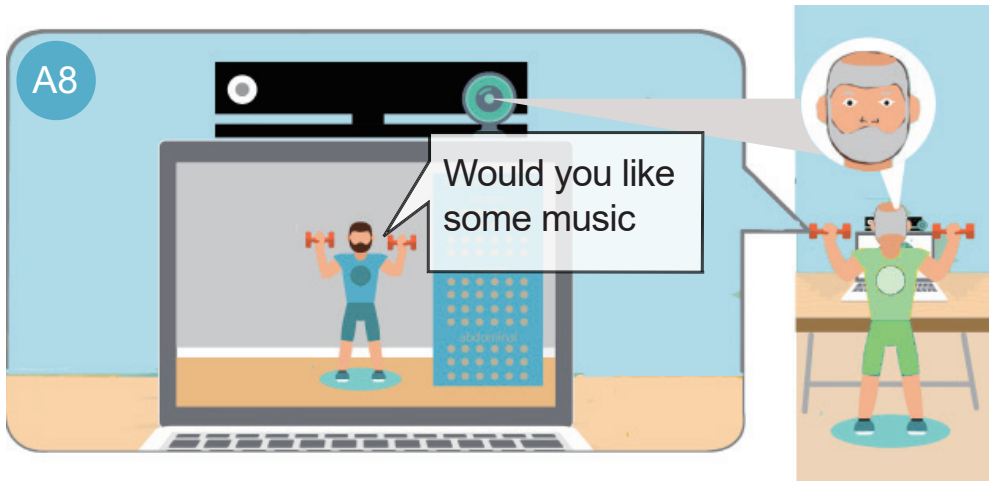
A5

- Trainers tells user that his motions are correct, so the wrestler is growing again.

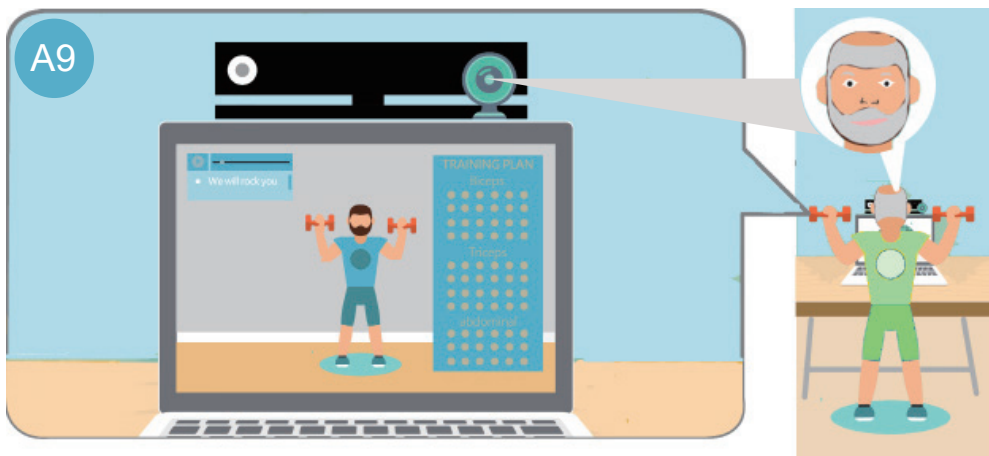


A7

- Ask user that does he want the lighting to be adjusted.

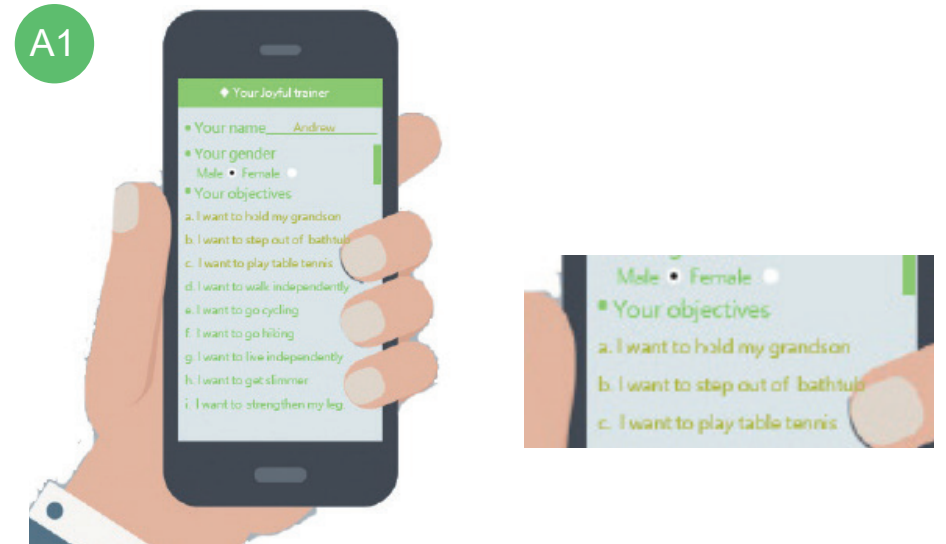


- Trainers asks user whether he wants some music



- Trainers says "Yes". Then "we will rock you" is played.

Concept three-Your digital coach

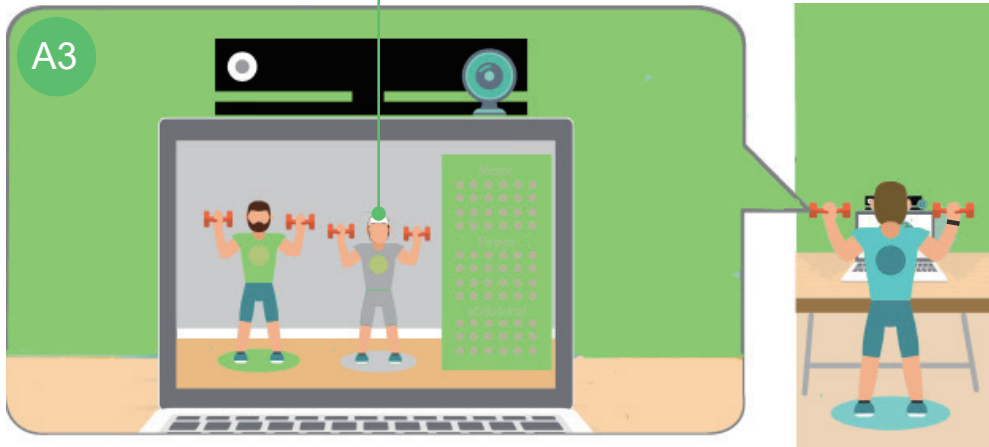


- User inputs objective

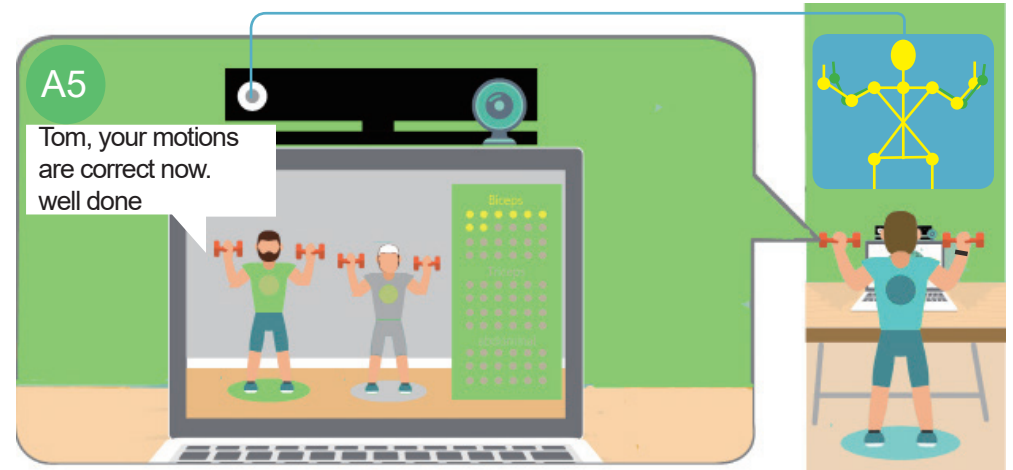


- System assesses users physical condition

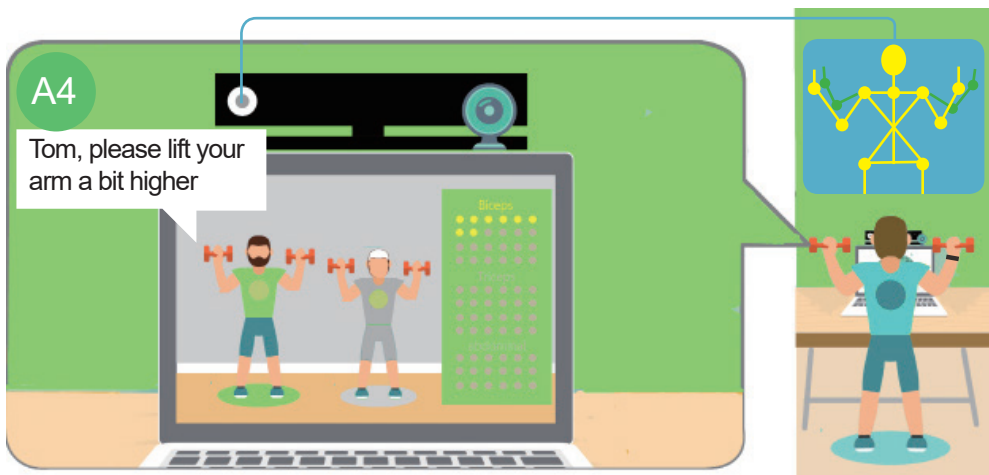
→ Surrogate role



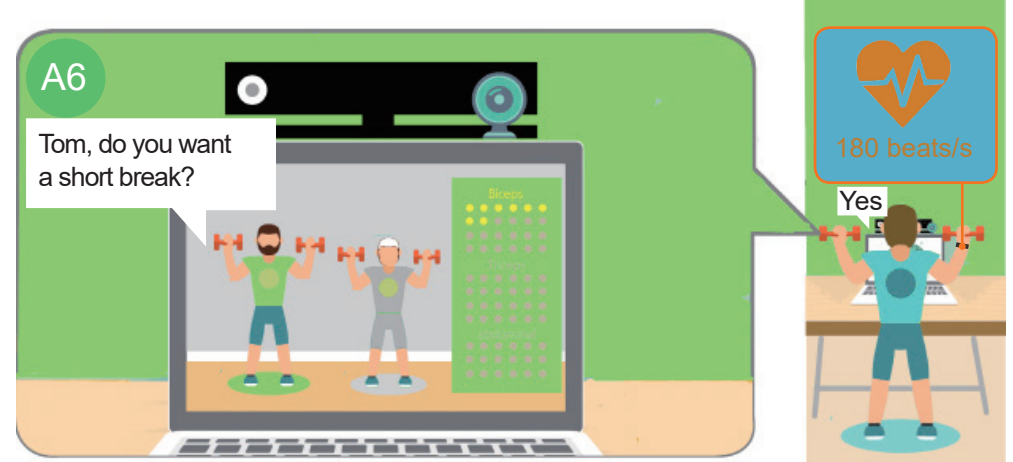
- System arrange training plan based on physical condition and personal objective



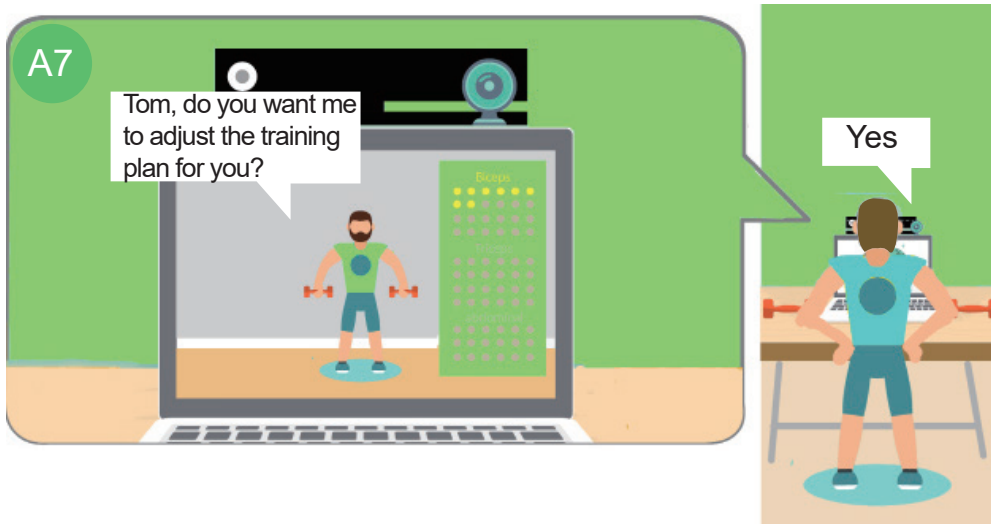
- System notify Tom that his motions are correct finally.



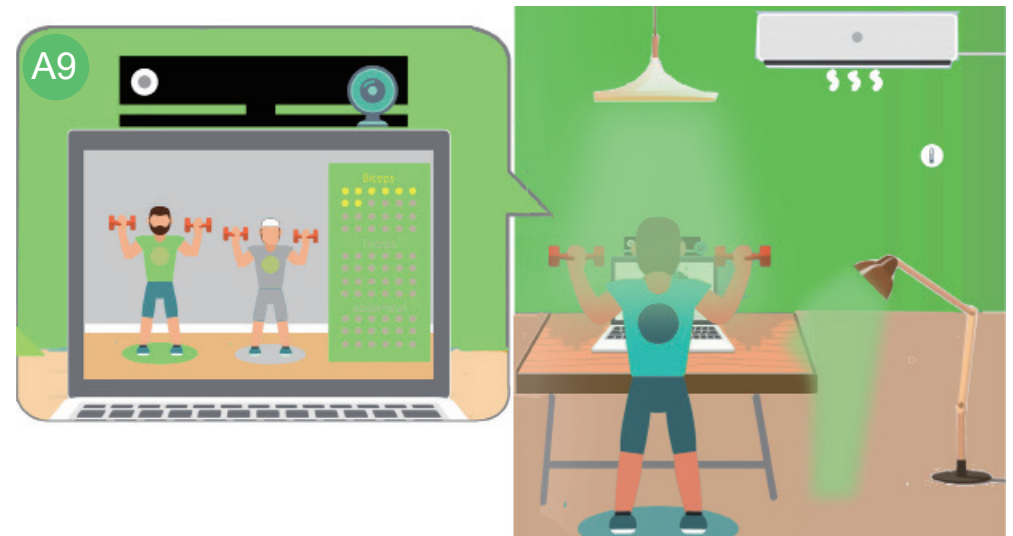
- System asks Tom to correct his motions



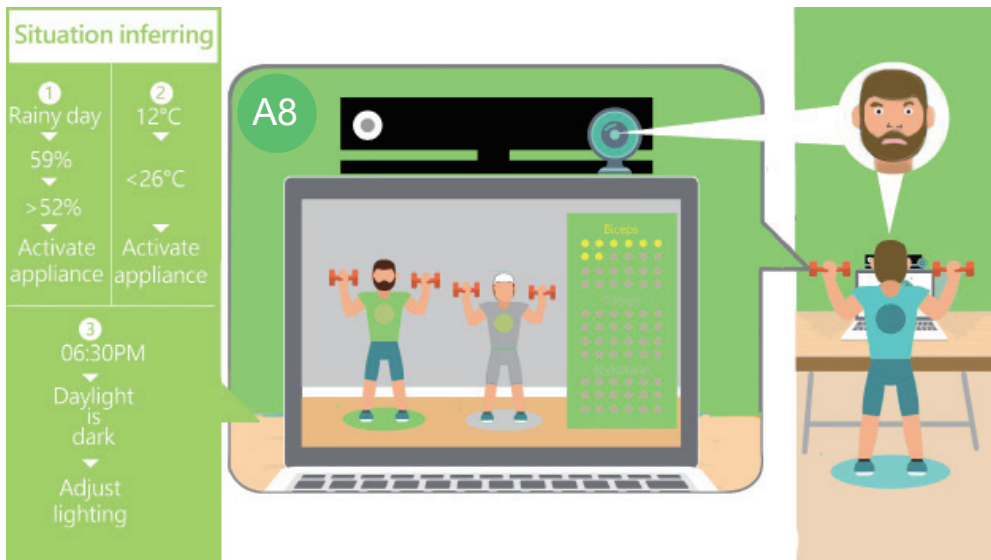
- When abnormality of heart rate is detected, system asks Tom if he wants to have a break



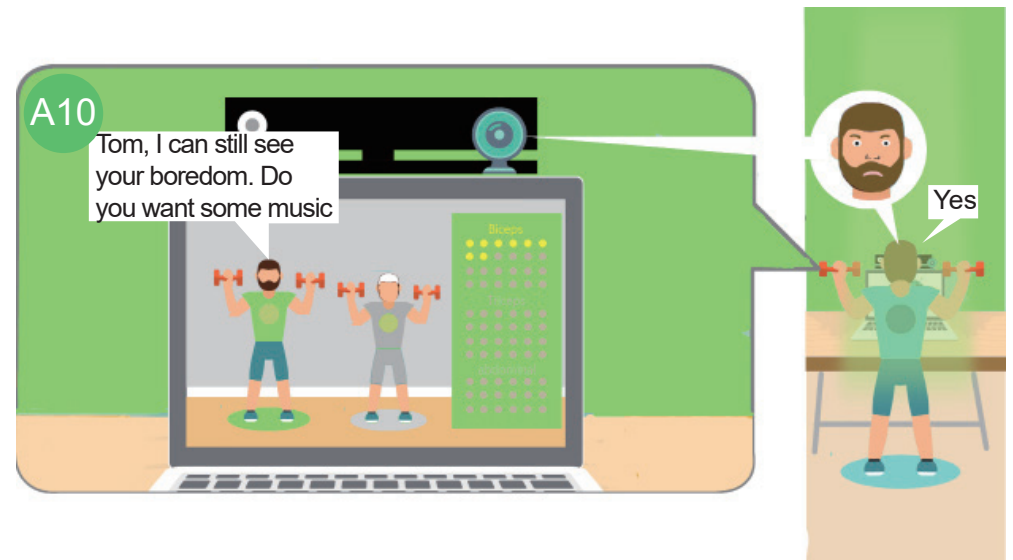
System also asks Tom if he wants the training plan to be adjusted



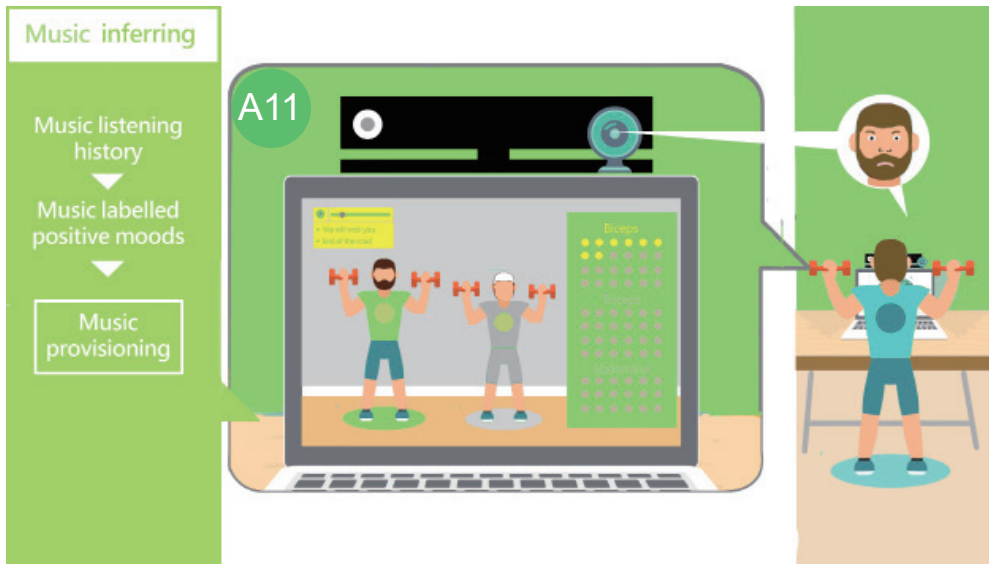
Then the lighting and air-conditioners are activated.



When Tom's negative moods are detected, the system decides to activate lighting and air-conditioner



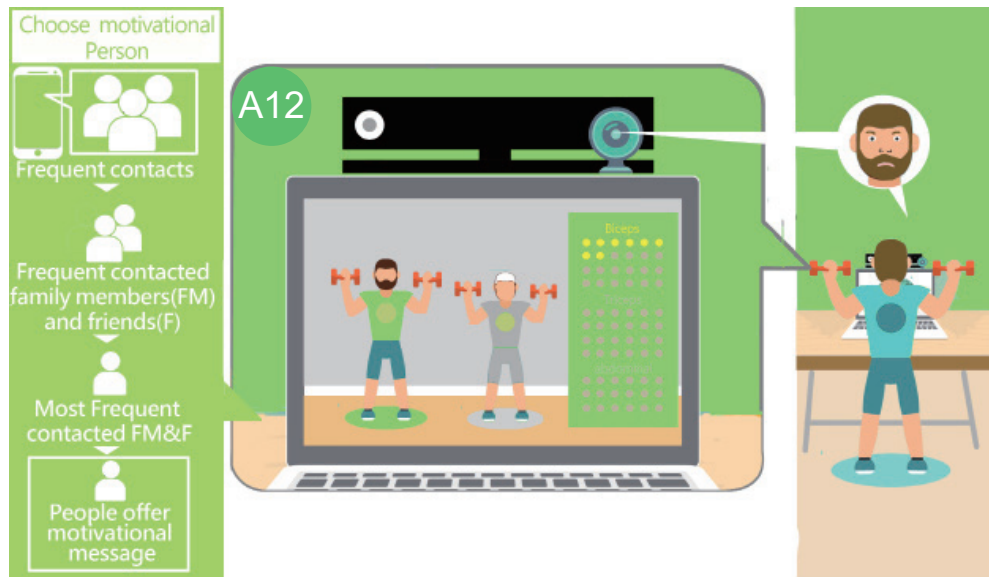
The system asks Tom if he wants some music when his boredom is detected



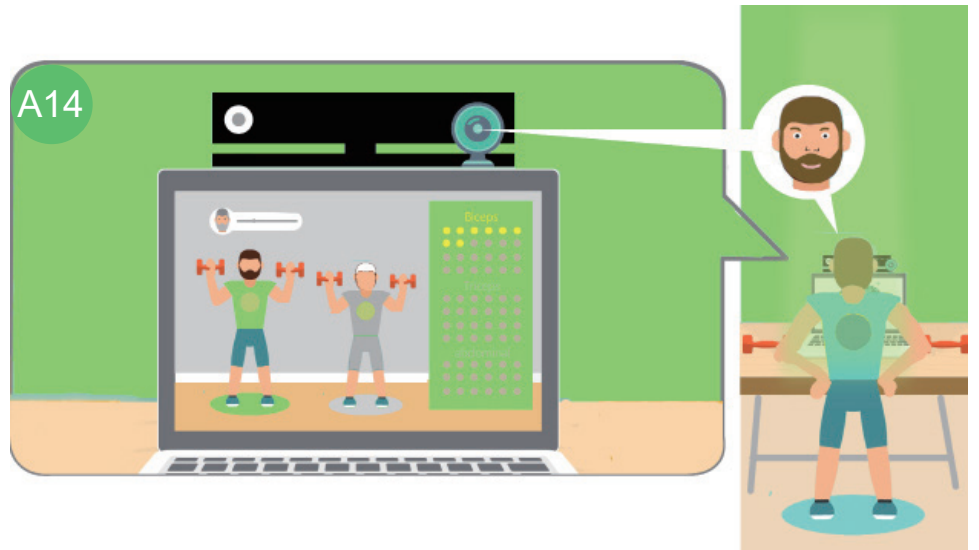
Tom says “Yes”, then the music is provided



The people, then, gives motivational message



The system also select person from contact history and invite his to provide motivational message



The happiness is observed on Tom's face.

3 Feedback evaluation & findings

	P1	P2	P3	P4	Total
Perceived usefulness	3	3	3	2.5	11.5
Necessity	3	3	3	3	12
Originality	2	3	3	2.5	10.5
Ease of use	2.5	3	2	3	10.5
User friendliness	2	2.5	2	2	8.5
Unintrusiveness	2.5	2.5	3	3	11
Total Score	15	17	17	16	65

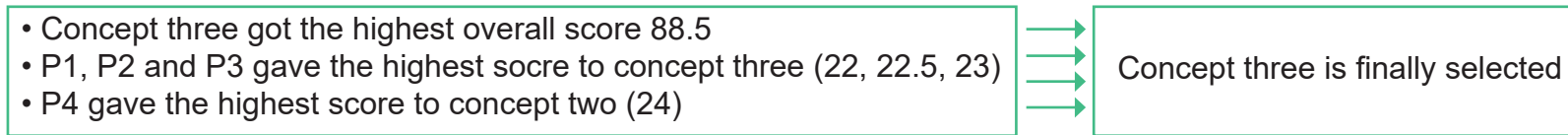
Table 1-Total score of Concept one

	P1	P2	P3	P4	Total
Perceived usefulness	3	4	4	4	15
Necessity	3	3.5	4	4	15
Originality	3	3	4	4	14
Ease of use	4	3.5	4	3	14.5
User friendliness	4	4	4	3	15
Unintrusiveness	4	4	4	3	15
Total Score	21	22	24	21	88

Table 2-Total score of Concept two

	P1	P2	P3	P4	Total
Perceived usefulness	4	4	4	4	16
Necessity	4	4	4	4	16
Originality	4	4	4	4	16
Ease of use	3	3.5	3	4	13.5
User friendliness	3.5	4	3	3.5	14
Unintrusiveness	3.5	3	3	3.5	13
Total Score	22	22.5	21	23	88.5

Table 3-Total score of Concept two



Suggestions on improving selected concept

- Some elderly do not have laptop at home, but most of the elderly resident in Holland have a TV at home. So the training or other contents should be displayed on TV.

Good features of unselected concept

- Inquiry are needed before services/interventions are provided. The inquiry could be "Do you want some music? Perhaps we can play the latest album of Boyz ii Man" for you
- The guidance should be provided in a joyful way instead of directly tell users that their motions are wrong. For example, in concept 2, the system said "See, your wrestler is not growing, perhaps you can lift your left arm a bit higher." "See, the wrestler is growing again, well done"

Redundant functions of selected concept

- Adjustment on lighting, temperature and humidity should be optional.

APPENDICE-D-About validation

1.Materials-A-Introduction	39
2.Materials-B-Assessment Matrix	40-41
3.Materials-C-Screenshots of demonstrative prototype	42-43
4.Feedback collection	43-46

Validation session

1 Materials-A-Introduction

Introduction

Kick-off

In the last few weeks, I generate a concept which can assist elderly to participate resistance training. So today, I would like to invite you to assess this concept.

Firstly, It would be interesting for me to know the extend to which you think the concept is useful for you.

Secondly, I am curious to know that whether you can handle the concept with little and zero assistance from other people.

Thirdly, I would like to know whether the concept is desirable for you or not. If you are the potential consumer, would you like to pay for it.

Procedures

Obviously, the session begins with prototype demonstration. The prototype is a slide which shows how the whole concept work and how potential user come across the concept.

When the demonstration is done, I would like to invite you to contribute your attitude towards this concept as well as your opinions about concept improvement.

This session would be ended up with a summary as well as the gift giving.

Assessment

During the assessment session

- The assessment will be done based on three aspects: 1) Desirability, 2) Usability, 3) Satisfaction.
- In order to assess the three aspects, every participants has to fill three matrix using the scale 1,2,3,4
- In the three matrix, only overall impression and some main fucntions are scored. (There are too many functions, so author was afraid that users may get confused)
- In the process of filling the matrix, respondents were asked to tell their reasons for fulfilling the score.

After the assessment session

- The scores given by the respondents to each function are added up using the following formula:

$$N = \sqrt{\frac{a^2 + b^2 + c^2 \dots n^2}{2}}$$

- When the value of N is lower than 3, the reasons for the low score have to be collected.

2 Materials-B-Assessment Matrix

Satisfaction

Do you believe that the functions of CP-DTS can address the issues the system is aiming to address?

Criteria	1	2	3	4
This program gives you satisfactory supervision				
The motivational message can effectively get you motivated				
Providing the music you like can increase your enjoyment				
The adjustment on indoor lighting, T&H can increase your enjoyment				
Exergaming can keep you motivated in a long term				

Usability

Do you believe that you can use this programme with zero or limit tutorial and assistance?

Criteria	1	2	3	4
You can fill in your personal information without tutorial				
You can set up this program independently,				
The functions for training management is not confusing				
You can notice and react to the inquiry				
The functions for motivation enhancement				
You can understand and play the game				

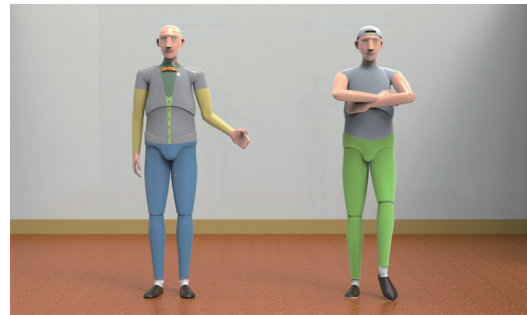
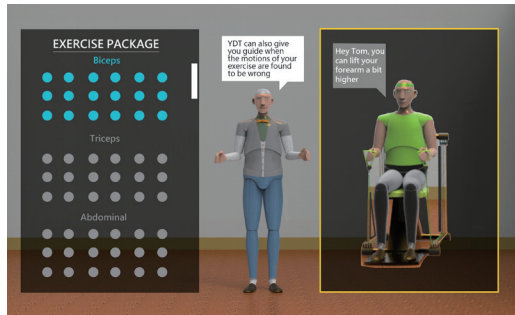
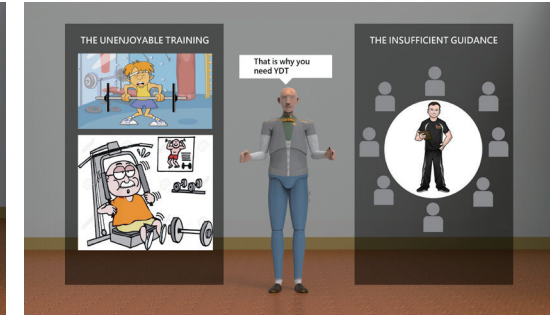
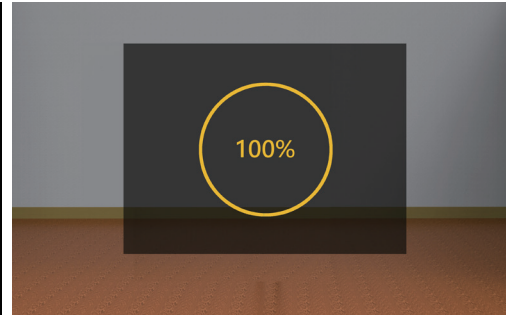
Desirability

Do you think you are willing to try or even pay for the functions of this programme?

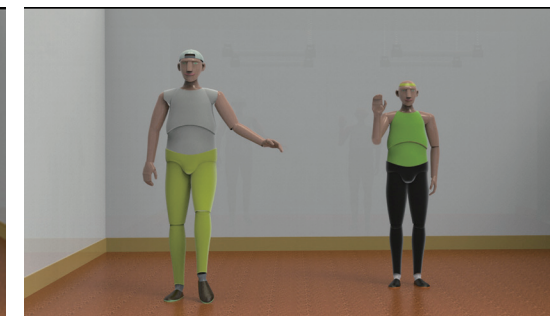
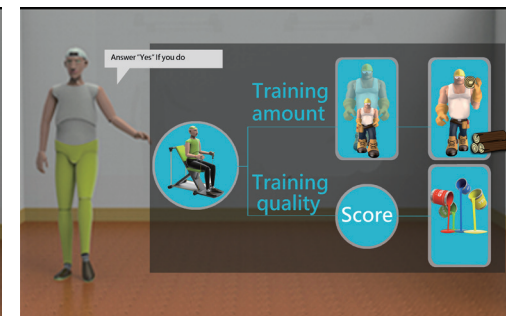
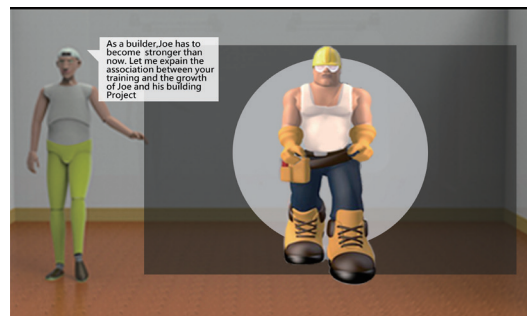
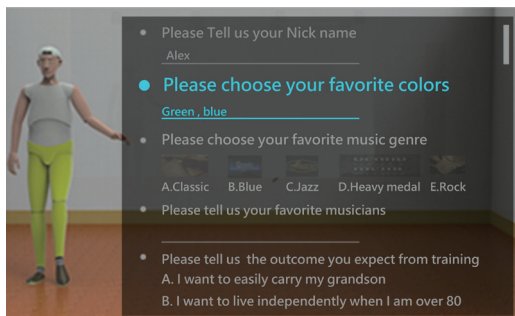
Criteria	1	2	3	4
You are willing to try the whole program.				
You are willing to pay for the whole program.				
You are willing to pay for some of the functions,				
You are willing to pay for the necessary components of this				
you are willing to pay the price for the extra/optional components of this program				

3 Materials-C-Some screenshots of demonstrative prototype

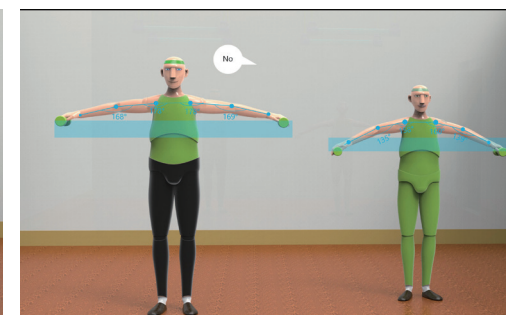
Introduction



Pre-setting



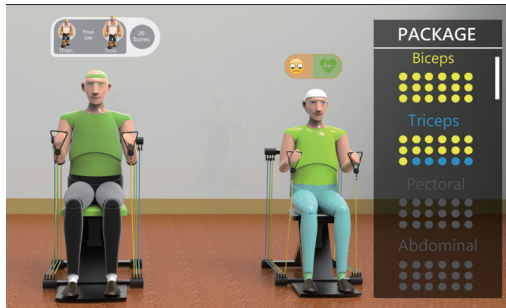
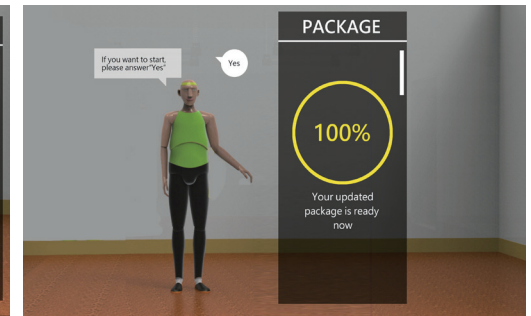
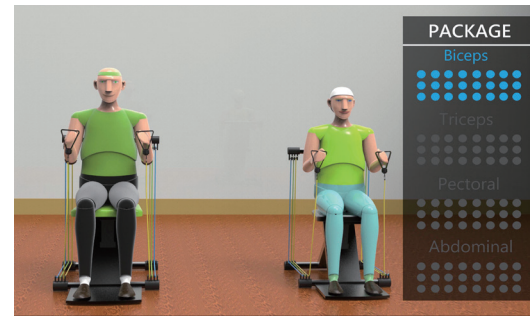
Physical condition assessment



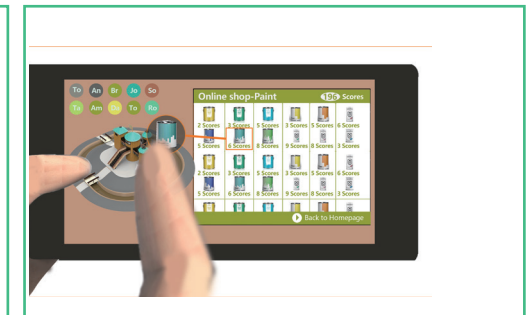
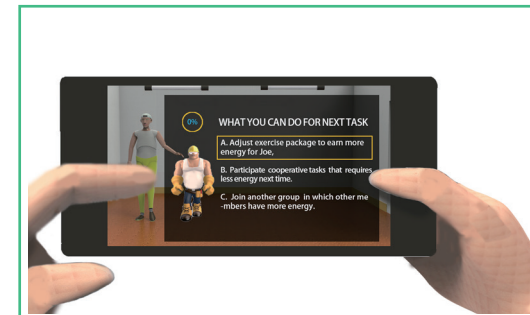
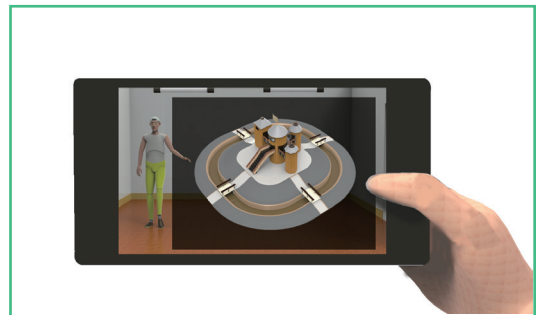
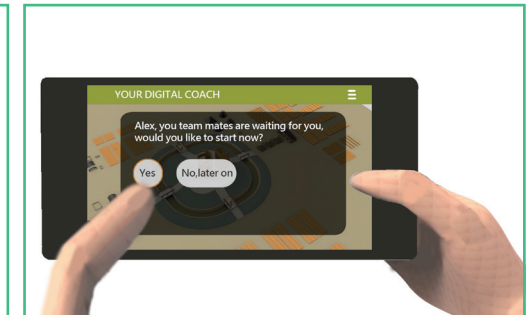
Initial exercise introduction



Training Process



Exergaming



4 Feedback collection-Some filled matrix and written feedback

R1-a

Satisfaction

Do you believe that the functions of CP-DTS can effectively address the issues that the system are aiming to address

Criteria	1	2	3	4
This program gives you satisfactory supervision				*
The motivational message can effectively get you motivated			*	
Providing the music you like can increase your enjoyment			*	
The adjustment on indoor lighting, T&H can increase your enjoyment			*	
Exergaming can keep you motivated in a long term			*	

Usability

Do you believe that you can use this programme with zero or limit tutorial and assistance?

Criteria	1	2	3	4
You can fill in your personal information without tutorial				*
You can set up this program independently.				*
The functions for training management is not confusing			*	
You can notice and react to the inquiry			*	
The functions for motivation enhancement			*	
You can understand and play the game			*	

Interesting but not sure if this game is easy to handle or not
Hard to judge the effort
The game is complex

R1-b

Desirability

Do you think you are willing to try or even pay for the functions of this programme?

Criteria	1	2	3	4
You are willing to try the whole program.			*	
You are willing to pay for the whole program.			*	
You are willing to pay for some of the functions.			*	
You are willing to pay for the necessary components of this			*	
you are willing to pay the price for the extra/optional components of this program			*	

TM is worth to try
Installing AC. Here cost too much, but if cost is not that high, why not try it

Respondent 1

R2-a

Satisfaction

Do you believe that the functions of CP-DTS can effectively address the issues that the system are aiming to address

Criteria	1	2	3	4
This program gives you satisfactory supervision				*
The motivational message can effectively get you motivated			*	
Providing the music you like can increase your enjoyment			*	
The adjustment on indoor lighting, T&H can increase your enjoyment			*	
Exergaming can keep you motivated in a long term			*	

Usability

Do you believe that you can use this programme with zero or limit tutorial and assistance?

Criteria	1	2	3	4
You can fill in your personal information without tutorial				*
You can set up this program independently.				*
The functions for training management is not confusing			*	
You can notice and react to the inquiry			*	
The functions for motivation enhancement			*	
You can understand and play the game			*	

Hard to judge
Note sure about if the message is useful or not
Lack of experience
Complex

R2-b

Desirability

Do you think you are willing to try or even pay for the functions of this programme?

Criteria	1	2	3	4
You are willing to try the whole program.				*
You are willing to pay for the whole program.			*	
You are willing to pay for some of the functions.			*	
You are willing to pay for the necessary components of this			*	
you are willing to pay the price for the extra/optional components of this program			*	

Installing AC, PTH cost too much

Respondent 2

Satisfaction
Do you believe that the functions of CP-DTS can effectively address the issues that the system are aiming to address

Criteria	1	2	3	4
This program gives you satisfactory supervision				*
The motivational message can effectively get you motivated			*	
Providing the music you like can increase your enjoyment			*	
The adjustment on indoor lighting, T&H can increase your enjoyment		*		
Exergaming can keep you motivated in a long term				*

"Hard to know the effect"

Not sure about if the content of message is motivational or not

Usability
Do you believe that you can use this programme with zero or limit tutorial and assistance?

Criteria	1	2	3	4
You can fill in your personal information without tutorial				*
You can set up this program independently.				*
The functions for training management is not confusing				*
You can notice and react to the inquiry				*
The functions for motivation enhancement				*
You can understand and play the game				*

Desirability
Do you think you are willing to try or even pay for the functions of this programme?

Criteria	1	2	3	4
You are willing to try the whole program.				*
You are willing to pay for the whole program.		*		
You are willing to pay for some of the functions.			*	
You are willing to pay for the necessary components of this			*	
you are willing to pay the price for the extra/optional components of this program				*

Extra ~~functions~~ money are not acceptable

Respondent 3

Satisfaction
Do you believe that the functions of CP-DTS can effectively address the issues that the system are aiming to address

Criteria	1	2	3	4
This program gives you satisfactory supervision				*
The motivational message can effectively get you motivated			*	
Providing the music you like can increase your enjoyment			*	
The adjustment on indoor lighting, T&H can increase your enjoyment		*		
Exergaming can keep you motivated in a long term				*

** Social → Training with friends → Friends' progress. → Encourage each other*

"The function is useful, but he prefer to daylight"

Some general exercises are needed.

Usability
Do you believe that you can use this programme with zero or limit tutorial and assistance?

Criteria	1	2	3	4
You can fill in your personal information without tutorial				*
You can set up this program independently.				*
The functions for training management is not confusing				*
You can notice and react to the inquiry				*
The functions for motivation enhancement				*
You can understand and play the game				*

Older generation do not know much about video game
Audio guidance is needed
Elderly follow the guidance
make things easier

Desirability
Do you think you are willing to try or even pay for the functions of this programme?

Criteria	1	2	3	4
1 You are willing to try the whole program.				*
2 You are willing to pay for the whole program.		*		
3 You are willing to pay for some of the functions.			*	
4 You are willing to pay for the necessary components of this			*	
5 you are willing to pay the price for the extra/optional components of this program				*

Some functions should be optional. (Lighting, temperature & humidity)
(Training management) is very good

Extra money → Not acceptable unless really needed ()

Respondent 4

RS-a

Satisfaction

Do you believe that the functions of CP-DTS can effectively address the issues that the system are aiming to address

Criteria	1	2	3	4
This program gives you satisfactory supervision				*
The motivational message can effectively get you motivated			*	
Providing the music you like can increase your enjoyment				*
The adjustment on indoor lighting, T&H can increase your enjoyment			*	
Exergaming can keep you motivated in a long term				*

Handwritten notes:

- Message should be about friends' progress
- Training with friend would be more motivational *
- No need, because of the uncertain effect of the function

Usability

Do you believe that you can use this programme with zero or limit tutorial and assistance?

Criteria	1	2	3	4
You can fill in your personal information without tutorial				*
You can set up this program independently,				*
The functions for training management is not confusing				*
You can notice and react to the inquiry				*
The functions for motivation enhancement				*
You can understand and play the game				*

RS-b

Desirability

Do you think you are willing to try or even pay for the functions of this programme?

Criteria	1	2	3	4
You are willing to try the whole program.				*
You are willing to pay for the whole program.		*		
You are willing to pay for some of the functions,				*
You are willing to pay for the necessary components of this				*
you are willing to pay the price for the extra/optional components of this program		*		

Handwritten note: Only the functions for training is acceptable

Respondent 5

RS-b

Desirability

Do you think you are willing to try or even pay for the functions of this programme?

Criteria	1	2	3	4
You are willing to try the whole program.				*
You are willing to pay for the whole program.		*		
You are willing to pay for some of the functions,				*
You are willing to pay for the necessary components of this				*
you are willing to pay the price for the extra/optional components of this program		*		

Handwritten note: Can not install extra home-hold appliance

RS-b

Desirability

Do you think you are willing to try or even pay for the functions of this programme?

Criteria	1	2	3	4
You are willing to try the whole program.				*
You are willing to pay for the whole program.		*		
You are willing to pay for some of the functions,				*
You are willing to pay for the necessary components of this				*
you are willing to pay the price for the extra/optional components of this program		*		

Handwritten note: Can not install extra home-hold appliance

Respondent 6

Thank you