IMD11112 Design Dialogues

COURSEWORK 2

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Word Count: 3019

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1. Introduction

The system I have designed is thought to be installed in The Lions' Garden at the Merchiston campus. It consists of an interactive bench that connects to acoustic sensors installed into different sections of the garden. People will have access to these sensors by connecting to the Relaxing Bench app. Touching-sensors will detect the presence of people on the bench and, through Bluetooth technology, people will connect to the acoustic sensors. The main idea is that people will be able to listen to amplified natural sounds and this will foster an interest in the garden and nature in general. The app will contain information about the garden and the permaculture principles that are at the heart of the foundation of The Lions' Garden. The bench will be built with sustainable materials, such as wood or bamboo, to keep harmony with the surrounding space. The aesthetic design will feature a dynamic shape which would include the installation of solar panels to allow the functioning of lights at night.

The motivations behind the project are mainly based on the fact that the garden is right beside the university library and I thought that such a system could help students have meaningful breaks from their study by providing them with a tool to relax and reduce stress. After exposing my idea during the lab sessions, I was suggested to explore the concept of ASMR (Autonomous Sensory Meridian Response) which is defined as a "*tingly feeling* that travels from the head downward that some experience in response to certain sounds, feelings, or descriptions" (Merriam-Webster Dictionary). It is thought that some natural sounds can trigger this feeling and induce relaxation (Coulson, 2020).

The aim of this design is to make people more aware of the environment that surrounds them. A full immersion into nature is possible through the listening of natural sounds. The intent is to encourage students to spend more time in the garden and discover the benefits that nature can have on their mental wellbeing. In particular, the project addresses the permaculture ethical principle of 'people care' in that it wants to offer new user experiences aimed at improving people's lives. Therefore, the blending of aspects of permaculture and UX can be seen in a design that tries to make use of technology to engage people with nature.

2. Design approach

The project has been guided by a human-centred approach and a scenario-based approach. All the phases of the design process included the participation of people. The objective was to adopt the perspective of potential users and find a creative solution to their problems. The design proposed wanted to create an experience and evoke some emotions as "User Experience (UX) is about engagement and interaction. It is an emotional as well as cognitive response to some technologies and content" (Egan & Benyon, 2017). In the initial phase, interviews and surveys have been used to

investigate habits and needs. Then, the data collected helped to develop personas and scenarios. The creation of a storyboard, a paper prototype and a mood board functioned as a means of expression of the idea developed. These forms of envisionment were also used in the testing and evaluation phase. The results from the sessions gave space for revising the initial concept, thus including an iterative approach.

3. Understanding

PACT ANALYSIS

A PACT analysis was considered necessary in order to frame the factors that have to be taken into consideration in the development of the design.

PEOPLE

As mentioned in the introduction, the main people the system is aimed at are students. However, when the garden will be open to the general public, all kinds of people could benefit from it, especially those who are affected by stress and anxiety. As the design is focused on training your hearing abilities to natural sounds, people affected by hearing impairment will not be able to benefit from it.

ACTIVITY

The activity will be mainly taking breaks from studying during which people will sit on the bench and, through the use of headphones, listen to natural sounds.

CONTEXT

The context will be outdoor in the garden.

TECHNOLOGY

The technologies involved are smartphones and headphones to access the app. Acoustic and touching sensors to access natural sounds.

3.1 Survey

Due to the time constraint, I decided to utilise surveys as a tool to understand potential users of my application. I managed to get responses from 28 students in total, partly based in Scotland and partly in Italy. What I tried to capture is their attitude towards stress and nature. The results show that most of the students spend some time in the library. As students, they sometimes feel stressed and usually take breaks very often. In the last case, they would rather go for a walk than stay inside. They are all interested in staying in contact with nature and find it a good way to relax. However,

about 30% of the respondents preferred to remain inside. This means that it is necessary to find a way to make the experience in nature more engaging.

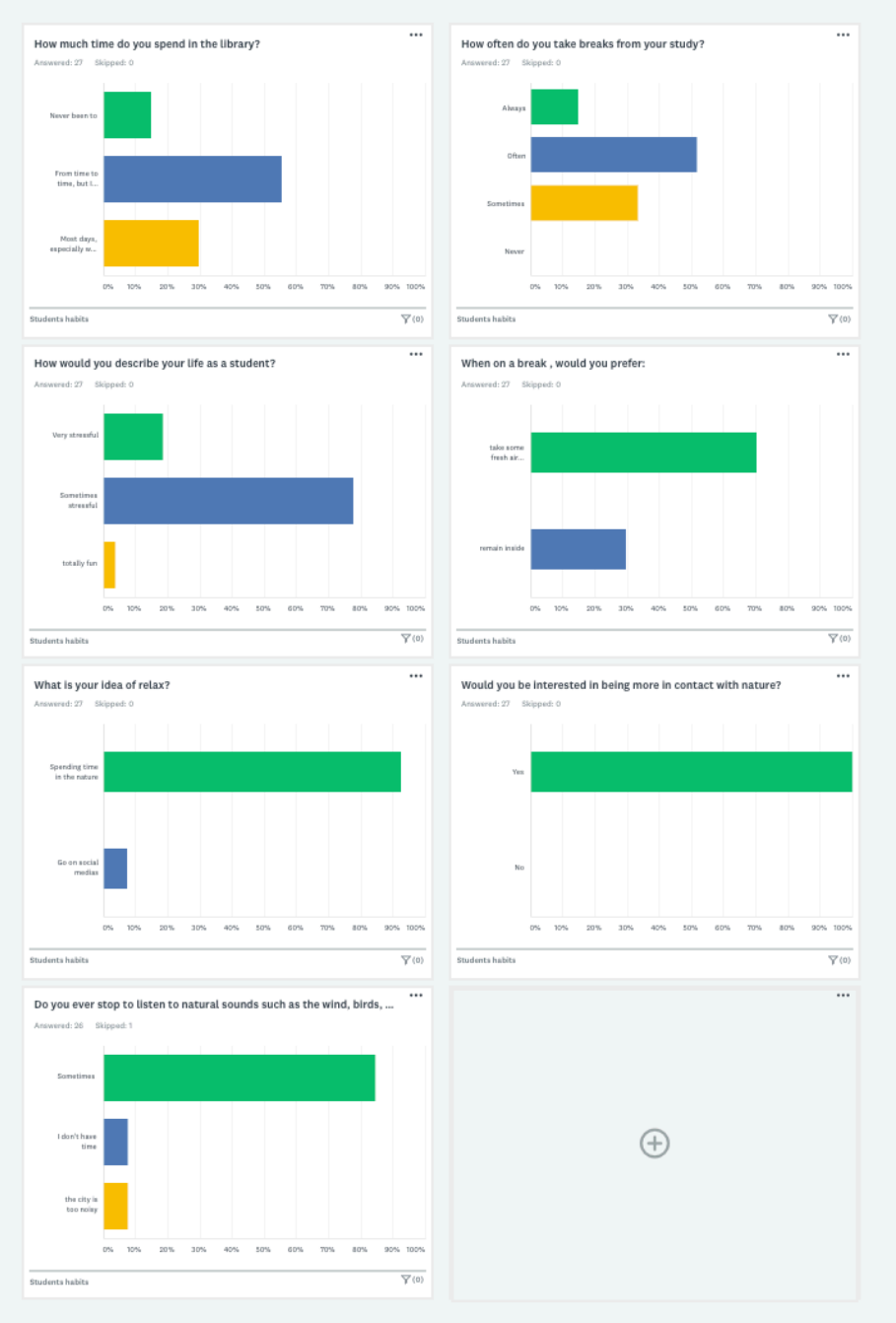


Figure 1 Survey

3.2 Interviews

In order to have a deeper understanding of the people involved, I conducted a series of semi-structured interviews (the transcript is available in appendix 1). These interviews helped me understand what kind of lifestyle the students lead and if something, like the design I developed, would fit well in their lives.

The participants were two students from Edinburgh and two students from Italy, all in their late twenties studying business, arts, languages and social science. In general, all of them are quite used to technology and it makes a big part of their life as students. Most of them agree that they would be willing to spend more time in nature if the technology was involved in it. In addition, they are open to new experiences regarding nature.

In terms of stress management, no one gave a clear answer on how they deal with stress even though they admitted they are often affected by it. Therefore, to the objective of this project, this can be considered as an opportunity to help students care more about their mental wellbeing.

3.3 Personas and scenarios

Based on the answer received, I developed two personas representing the ideal users of the system.

Name: Nadia
Age: 28
Occupation: student
Location: Florence

Figure 2 Persona 1

Background: Nadia has always been interested in fine arts. She moved to Florence to study for a master's degree. She usually spends entire days in the library trying to keep up with the amount of study her course requires. Although stressful, she enjoys studying what she is passioned about.

Likes: spending time in museums.

Technology skills: she uses her laptop and phone regularly.

Goals: to enrich her life with new experiences.

Limitation: she doesn't have much time.

Name: Jeroen
Age: 27
Occupation: student
Location: Edinburgh

Figure 3 Persona 2

Background: He has lived in Edinburgh for 10 years and he is trying to combine his life as a student with his part-time job as a receptionist. When it comes to busy times, he tends to procrastinate his tasks and feeling frustrated.

Likes: being helpful to others and spending time with his family.

Technology skills: he uses mainly his phone, but it is quite familiar with other devices.

Goals: to manage his time wisely.

Limitation: he tends to lose his concentration quite often.

Concrete scenario 1

Nadia needs to do some research for her upcoming project. She decides to use the library at her university. The library is packed with people, but she manages to find a place for her. As she sits down, she notices that outside the library there is a quite appealing garden. She decides that when she will need a break, she would go there to explore a little bit. As she enters the garden, she realises that there is a particular bench that seems quite different from a normal one. Just beside the bench, there is a message inviting the public to scan the QR code in order to download the relaxing bench app. After downloading and opening it, the app invites her to take a sit and wear her headphones in order to start her journey through natural sounds. The interface invites her to click on the screen to start the session and soon the sound of the wind moving the tree leaves and the grass starts. The app explains to her that these are live sounds from the surrounding area, and it goes on specifying the benefits the immersion in nature can have on her mental health. Nadia is quite surprised by the new experience and she thinks she would use it again the next time she is at University.

Concrete scenario 2

Jeroen is studying at the university library. He has used the Relaxing Bench a couple of times before. Being a beautiful sunny day, he wants to have a break in the garden and sit on the Relaxing Bench. He sits on it and soon a message pops up, inviting him to wear his earphones. He has the option to

choose among different sections of the garden. This time he opts for the pond. The listening session begins. He starts listening to the water running and he also spots some animals he does not recognise. Therefore, he decides to have a look at the app to see if it has some information about the ecosystem he may find in the pond. He soon realises that what he has spotted was a frog. Jeroen has finished his break and goes back to the library, happy to have taken his mind off the study for a little bit.

4. Envisionment

Sometimes it is really difficult to express the idea behind a project. That is why the different methods of envisionment employed have been really useful when communicating the concept to others as well as to explore, even further, the potential of the design.

4.1 Storyboard

At an early stage, a storyboard was drawn to try to visualize the flow of the actions (fig. 4). The storyboard helped me to identify some other requirements. In particular, the reflection on the design raised the question of how the users would have access to the app the first time. Therefore, it was decided that a message with the QR code should be placed near the bench to let the visitor know what that was all about and download the app. This scene was also added to the concrete scenario 1. The storyboard shows the unfolding of the action, as a person uses the system for the first time.

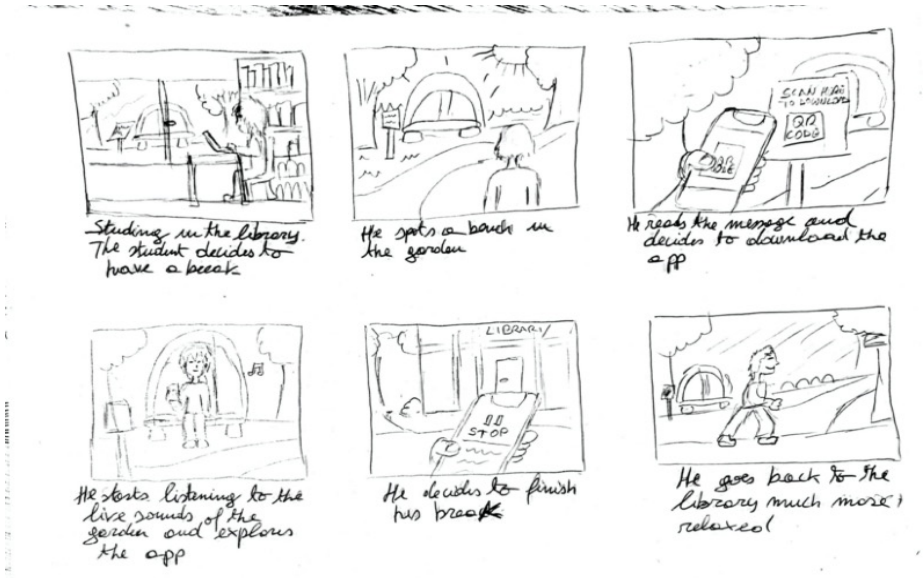
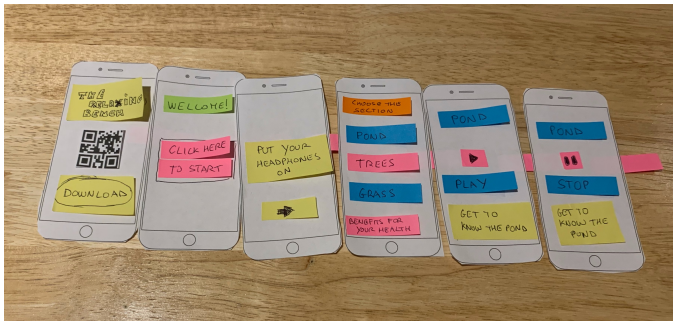


Figure 4 Storyboard

4.2 Paper prototype

As a second method of envisionment, a paper prototype was chosen. This was particularly useful to conduct some testing session at a later stage and reproduce the scenarios described in the understanding phase. The model represents the paper version of a normal smartphone. Sticky notes have been used to act as buttons and to easily move them if needed.



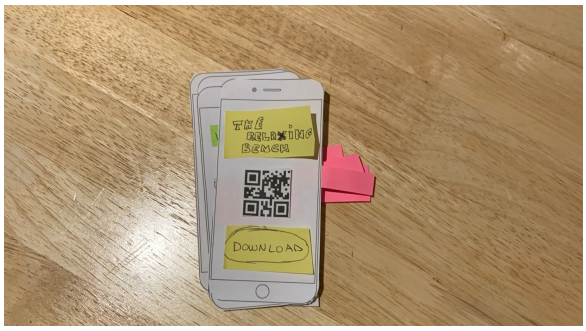


Figure 5 Paper prototype

4.3 Mood board

A mood board has been utilized to give the idea of the atmosphere and feeling the design wants to communicate.

Figure 6 Mood board

5. Testing

5.1 Cooperative evaluation

For this method, I took into consideration the guidelines for cooperative evaluation on p. 251 of *Designing User Experience* (Benyon, 2018). The people involved in the testing were two people who participated in the initial interview and one new student studying international business at Napier University. I managed to meet one person face-to-face while the others had to be tested through video call. In the last case, I used Marvel (it can be seen at https://marvelapp.com/prototype/fed812e), an app that allows you to make your paper prototypes interactive. Testing has been conducted with the paper prototype by asking the users to perform certain tasks taking into consideration the concrete scenarios proposed in the understanding phase. They were guided throughout the session as the lo-fi prototype provided little input. However, I asked them to describe what they were thinking while performing the tasks.

The task required them to pretend to be sitting on a bench outside, open the app, wear headphones and start listening to the sounds. In this case, I had provided them with some natural sounds in order to simulate the real situation as much as possible. After the session, I asked some general questions:

How easy was the task?
How realistic was the task?
What was the best and the worst thing of the prototype?

Summary of the responses
In general, the prototype was judged easy to understand and to use. The buttons were big and easy to read and the symbols to start and stop the sounds were helpful to understand what to do. The idea of relaxing with natural sounds was really appreciated and some of them thought that a more realistic setting would help empathize better with the situation.
In general, two out of three people showed some frustration because the paper prototype had not been developed enough and this did not allow any further exploration of the sections. Finally, one of the participants suggested that a more varied choice of sounds could make the app more appealing.

Problems encountered
Due to the nature of the prototype, clicking on the buttons was not that intuitive and I had to intervein to explain what would happen next. However, I tried not to give too many answers and give the freedom to explore.

5.2 System Usability Scale (SUS)

The System Usability Scale is largely used as a testing tool because it allows to quickly measure usability. It consists of ten questions to answer with a Likert-Scale (from 1 to 5) to indicate agreement or disagreement with the statement. It is used to assess the ease of use in terms of effectiveness, efficiency and satisfaction (Smyk, 2020). The following is the questionnaire they were asked to complete after the testing session.

System Usability Scale

For each of the following statements, please mark one box that best describes your reactions to the relaxing bench today.

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

Figure 7 SUS questionnaire from Usability Test: https://www.usabilitest.com/

In the table below are shown possible scores and their meaning. If the score is below 68, it means that it is below average, anything above is considered acceptable (Usability.gov, n.d.).

SUS Score	Letter Grade	Adjective Rating
Above 80.3	A	Exellent
Between 68 and 80.3	B	Good
68	C	OK
Between 51 and 67	D	Poor
Below 51	F	Awful

Figure 8 SUS score table

The questionnaires (see Appendix 2) scored respectively 82.5, 80 and 75 and this means that all the participants found the usability of the system quite good.

6. Evaluation

6.1 Expert evaluation

As a UX expert was not available to evaluate the design, I decided to ask the opinion of a sound engineer as sounds were mainly involved. I described once again the idea behind the project and showed the storyboard, the prototype and the mood board. After trying to perform the task as described in one of the concrete scenarios, he suggested that to enhance the user experience, it would be ideal to have a good optimization of the sounds, which is possible only with careful positioning of microphones. The sounds can then be recorded and mixed in high quality. Moreover, he mentioned that the use of augmented reality would make the difference in the user engagement. Specifically, pointing the camera to different areas of the garden could trigger different sounds typical of those particular places. In general, he found the design original and easy to understand but he thought that is necessary to do more to improve the overall experience.

6.2 Focus group

Focus group has been chosen as an evaluation method to gather some feedback about the entire experience. Other three students were invited to evaluate the final product. They were shown the storyboard, the mood board and the prototype. A brief explanation of the concept and the description of the concrete scenarios were given and then they were left to explore the paper prototype with some guidance. After that, they were invited to comment on the material.

Result

From the session, it has resulted that they would be happy to use the system due to the original concept behind it. However, some of them expressed some concern about the fact that, in the long term, the experience could become a bit repetitive. It was suggested that a way to make the system more engaging should be considered. For example, it could be a good idea to let the users guess the sound they are listening to. What they like the most was the easiness of use of the system and the fact that it is something that they would not expect in a garden. They also highlight that such a system could not be used during bad weather and it could actually represent a missed opportunity to experience the sound of rain.

Final reflection

In this project, it would have been really useful to practice physical and physiological measurements in order to measure emotional reactions. Good indicators could have been heart rate or rate of respiration (Benyon, 2018). Unfortunately, due to the lack of resources, this has not been possible at this time, but it would be surely considered in future projects.

7. Conclusion

The design described in this project was thought to be used by people and because of that, a human-centred approach seemed to be the most logical approach. People's needs and point of views have been researched and considered throughout the entire design process. The testing phase has given the opportunity to revise any aspects of the design based on the feedback received. This clearly showed the iterative nature of the design process which, especially at an early stage, easily enables changes to be made in order to meet future expectations. The use of the scenario-based method has once again resulted useful to give shape to abstract ideas. The description and the visualization of the actions, through the scenarios and prototype, allowed a good understanding of what was expected from the app. However, the evaluation phase revealed many gaps that would need to be addressed before developing a hi-fi prototype. As always, when dealing with people it is important to take into consideration any ethical issues. For this reason, freedom of action and thought has been guaranteed as much as possible during the testing and evaluation stages.

Appendix 1

Interviews transcription

1. **Do you use much technology while studying? If yes, what? If no, why?**

"Yes, I use my computer because my lecturers don't accept paper essays and so I have to hand them in electronically."

"Yes, I often use technology to study. Generally, my phone and my laptop because they help me a lot"

"When I study, I prefer using only books. In case I don't know something, I use google and Wikipedia".

"I mainly use my laptop"

2 How do you handle stressful situations? Are they overwhelming to you? Do you have a method to reduce stress?

"Remain calm, start doing everything slowly such as studying, reading or working as well as walking. My brain will assimilate that the action I am doing is not stressful."

"When I'm stressed, I have the bad habit to drink alcohol and procrastinate my chores by watching YouTube or films. My method of recognising stress is by asking myself what the source of stress is."

"I don't have a specific method to manage stress but if anything, it would be great to keep your mind off problems for a little bit. However, when I have deadlines, I just have to deal with it and try to go on".

"I handle stressful situations by going for a walk. Sometimes they could be overwhelming. Actually, I don't have a method to reduce stress".

3 Do you care about sustainable practices? i.e., recycling, local produce etc. Do you know what permaculture is?

"Yes, recycling, regrowing plants, using sustainable products. No, I don't know what permaculture is."

"I don't know what permaculture is, but I guess it has to do with sustainability. Generally, I recycle and I try not to waste as much as possible. When possible, I try to eat local.

"I care about sustainable practices and I don't know what permaculture is".

"Yes, I usually recycle and try not to eat produce that is out of season. I also use reusable shopping bags."

4 Would you spend more time in nature if technology was involved? If yes, what technology do you expect to be involved? if no, what can make you more interested in it?

"Yes. It would be great to have maps to walk into nature, apps to scan plants and interesting things that I find in nature. Apps for tracking number of people that walk in a specific area. Scanning of areas where you can see the benefits of aromas in plants, sounds and visual. Aromatherapy, colour therapy, sound therapy."

"I think being in nature can take away a lot of stress and so I would love to wear a VR headset whenever possible because I heard that its technology can virtually transport me to any type of place ."

"It depends. I usually prefer pristine nature. If anything, I would prefer pathways and benches to fit in the nature and don't spoil it. The same I can say for technology, it would need to blend in it. I would use technology to make the experience in nature more secure"

"Yes, but I would only use devices that will help you focus exclusively on nature"

5 **Are you willing to try new ways of experiencing what nature has to offer?**

"It depends. If it is not dangerous, I would be more than happy".

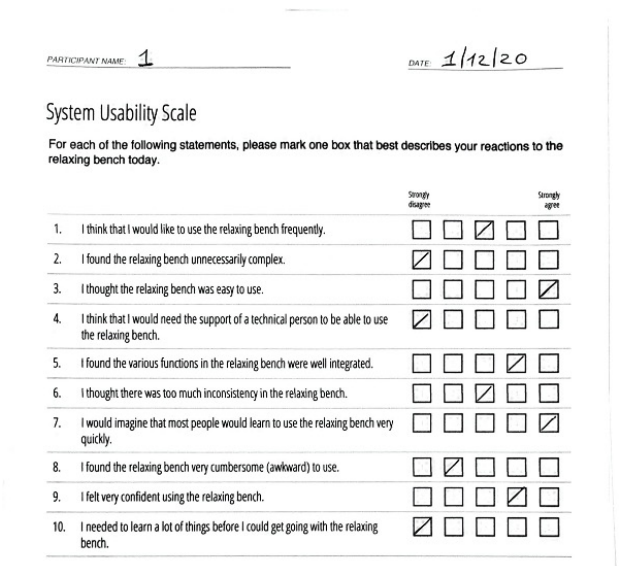
"Definitely, it is such a mysterious world that it is worth exploring it".

"Not so sure what that means, if I knew more details, I would maybe consider it".

"I don't see why not. If that is an opportunity to enjoy nature more".

Appendix 2

SUS questionnaires

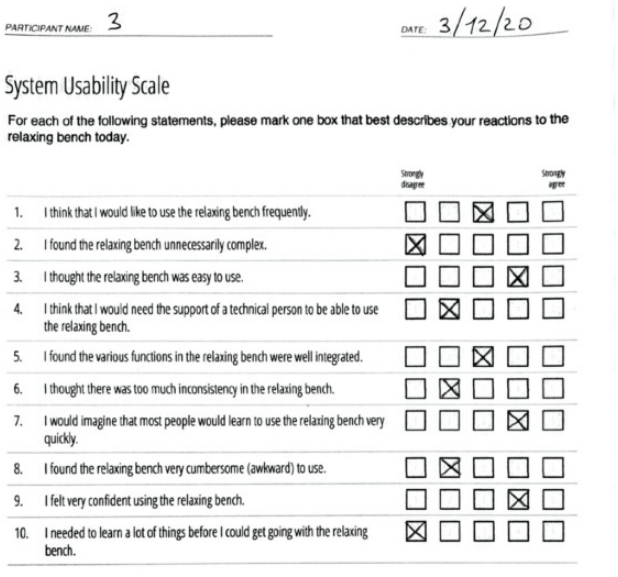


PARTICIPANT NAME: 1 DATE: 1/12/20

System Usability Scale

For each of the following statements, please mark one box that best describes your reactions to the relaxing bench today.

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



PARTICIPANT NAME: 3 DATE: 3/12/20

System Usability Scale

For each of the following statements, please mark one box that best describes your reactions to the relaxing bench today.

		Strongly disagree				Strongly agree
1.	I think that I would like to use the relaxing bench frequently.	☐	☐	☒	☐	☐
2.	I found the relaxing bench unnecessarily complex.	☒	☐	☐	☐	☐
3.	I thought the relaxing bench was easy to use.	☐	☐	☐	☒	☐
4.	I think that I would need the support of a technical person to be able to use the relaxing bench.	☐	☒	☐	☐	☐
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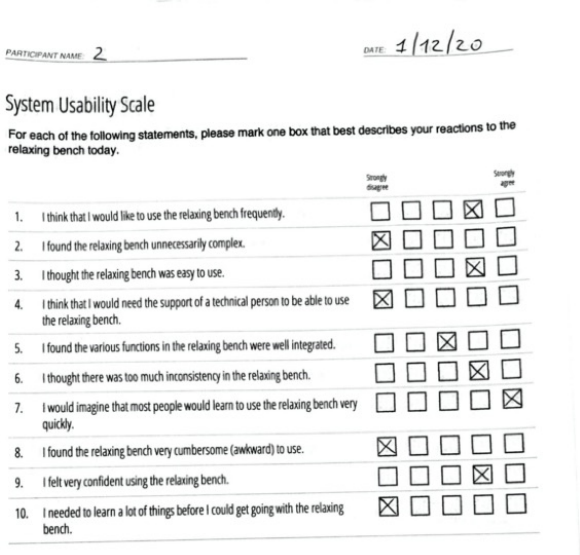
9.	I felt very confident using the relaxing bench.	☐	☐	☐	☒	☐
10.	I needed to learn a lot of things before I could get going with the relaxing bench.	☒	☐	☐	☐	☐



PARTICIPANT NAME: 2 DATE: 1/12/20

System Usability Scale

For each of the following statements, please mark one box that best describes your reactions to the relaxing bench today.

		Strongly disagree				Strongly agree
1.	I think that I would like to use the relaxing bench frequently.	☐	☐	☐	☒	☐
2.	I found the relaxing bench unnecessarily complex.	☒	☐	☐	☐	☐
3.	I thought the relaxing bench was easy to use.	☐	☐	☐	☒	☐
4.	I think that I would need the support of a technical person to be able to use the relaxing bench.	☒	☐	☐	☐	☐
5.	I found the various functions in the relaxing bench were well integrated.	☐	☐	☒	☐	☐
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9.	I felt very confident using the relaxing bench.	☐	☐	☐	☒	☐
10.	I needed to learn a lot of things before I could get going with the relaxing bench.	☒	☐	☐	☐	☐

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