The aim of the co-design workshop was to evaluate the usability of the prototype and to find out how easy the system is to use by people with stroke, to examine what problems the system poses and how it could be improved. We asked participants to perform a few tasks using the system while thinking-out-loud by telling us what they think. The prototype was evaluated based on a scenario where the participant uses the system in their home to perform resistance therapeutic exercises regularly to help them self-manage their stroke rehabilitation. The following criteria were used to evaluate different aspects of the prototype:

1. Structure, e.g., the size of the hardware/software, the material used to make the handles and the weights, the colour of the handles, weights and the colour used to create the content of the interface, the font of texts on the App, the content of the App, the acceptability of different forms of feedback provided to them on the App and their motivational aspects.
2. Functionality, e.g., how easy or difficult it is to use the software/hardware, the reliability of the feedbacks; scores, graphs, and what form of feedback they prefer to receive.
3. Acceptability, e.g., How the system would fit into their lives, how acceptable it would be to family and friends.
4. Usability, e.g., whether the system is easy to clean, easy to store, easy to set up, assemble and disassemble.

**Findings**

*Co-design workshop 1*

They found the system simple and easy to use. They believed that it was important to keep it simple and not to make it complicated. They preferred the thicker handle as it was easier to use. The colour of the hard ware was fine. They found the interface was fine, the number of reps, duration of each session and the energy level provided them with simple feedback. The text font was good and there was no need for extra text to be added to the interface. Some participants found the weight too heavy for a beginner. They suggested that a range of weights should be available starting the exercises with lighter weight or no weight. They believed that the system is more suitable for stroke survivors at the earlier stage of stroke. The workshop also raised questions about the connection between the sensor and the iPad, using Android or iOS and the possibility of using a laptop instead of an iPad. In general, they thought that it felt good as an equipment to use the system.

*Co-design workshop 2, 3*

P: I couldn’t make a cup of tea, I couldn’t brush my teeth, I couldn’t wash properly.

P: You think your life is completely ended. You have to start again as if you’re a baby, learning something new.

P: loss of dexterity.

Preferred the wider handle. One participant found the exercises relatively easy and feasible to perform. They didn’t identify any specific safety problems but one participant suggested the use of a kind of harness to secure the hand grip which reduces the risk of dropping on foot in case somebody drops it.

P: I have those little dumbbells; I use them but I have to feel like it first. Sometimes I could leave it for weeks before I do it again. I haven’t got the motivation.

P: I am a former IT and communication consultant; I know what is all about here but it’s not something that motivates me a great deal. I’m too busy doing other things, I have plenty of other interests but they don’t exercise me, exercise my brain, the motivation is the key thing, and I need more than this to motivate me. I love the product as it is. Motivation for me is somebody standing in front of me and shouting at me. [you need personal one to one coaching rather than virtual exercises].

P: I don’t like anything like [the App] this, they stress me, I’ve got to do this, I’ve got to do that, my heart rate goes up and then

P: you reach to sort of a thing called brain fog, so much pressure

The preference is real coach and if not, possible it should be virtual coach not a digital interface.

P: not everybody is mentally ready to come here and use the equipment, it could take a while, it could take years.

P: I think if you could explain to them that it would help a great deal.

P: I was told that if you are exercising your left arm but think that you are exercising your right arm as well, it mentally helps you. So, this is why that would be you know just thinking of it but physically doing it.

P: every item on that screen needs to be bigger.

P: a lot of people don’t bother to eat after the stroke, when you say energy that would encourage them to eat and have the energy to use this App.

P: using hemp to make the hard ware.

P: it’s a very good product.

P: I think it’s absolutely brilliant, my husband who has no movement in his affected hand and arm, he thought it would be absolutely ideal for somebody in his position. The fact that you would have a display of the effort you’re putting in, etc would help motivate people because I think the loss of motivation to do things over time is such a big factor particularly for those who have limited movement so we support it %100.

P: that tool for me wouldn’t work at all.

P: the seesaw idea and line graph