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Transferability of participants perspectives to technologists

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Approvals

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Short Abstract

This report documents the body of work undertaken withinWP7. task 7.2, and specifically considers the transferability of participants' perspectives to the technologists. It provides an overview of the co-design activities undertaken and the role that Sheffield Hallam University has played in the planning and co-ordination of these. It summarises the feedback and findings from potential end users of NESTORE in relation to the pathways and interface requirements of the system and ends with recommendations from this phase of the work to date as well as reflections on the contribution and complexity of co-design within the project.

This work package runs from M6-M18, in order to give a enriched view of activities completed we will update this document at the end of M18.

Key Words

Co-design, co-design tools, interface design, personas

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1. Co-design within NESTORE.

1.1 Methodology

Co-design is an approach to design, which actively involves all stakeholders in the design process to help ensure the result meets their needs and is usable. Reports 7.1 and 7.3 (already submitted) describe the value of co-design in the context of technology particularly technologies with a health related function. Indeed the context of where the technologies will operate and how they relate to the end-users lives are key factors. A number of researchers have suggested that the poor design of many devices may be attributed to the failure to find ways to engage end-users and to elicit understanding of their requirements and NESTORE therefore adopts co-design tools and methods that will seek to engage and elicit information related to perception, acceptance and usability of technology to support healthcare.

The methodological approach followed in NESTORE, provides for users to be involved in the design of the solution throughout the project duration and permeates the work of all the work-packages.

This approach has permeated the research. Professor Paul Chamberlain, Dr. Claire Craig and Nick Dulake, Sheffield Hallam University in the United Kingdom bring significant experience and expertise to this area and have co-ordinated much of this activity and whilst they are not work package leaders they continue to work across a number of the work-packages. This co-ordination is illustrated in the diagram below: (Figure1)
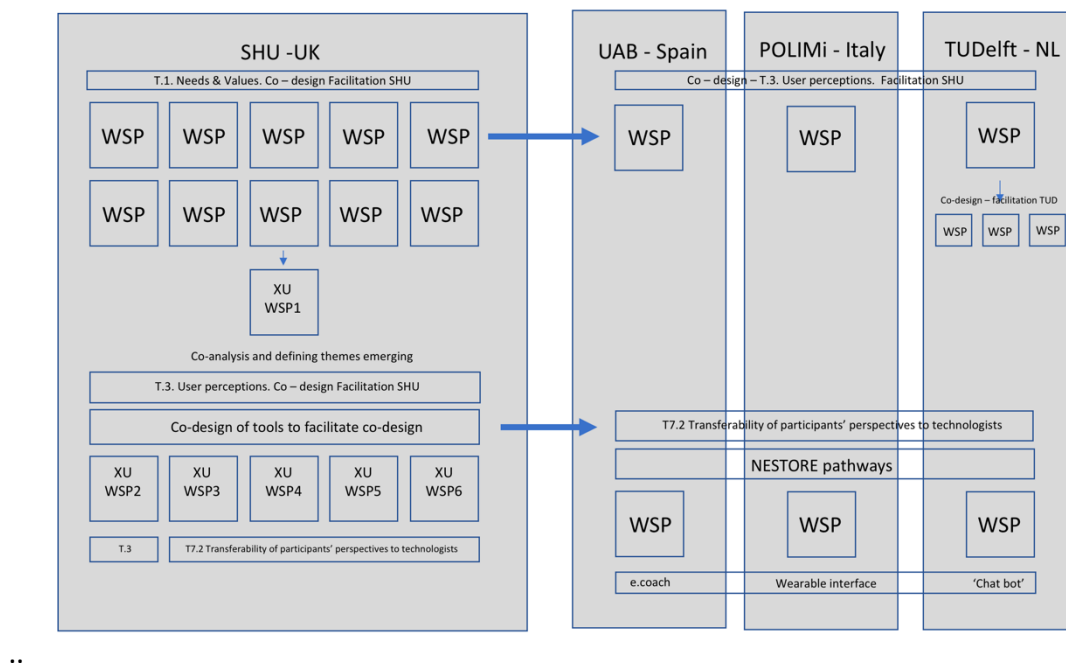

Figure 1: Schematic of co-design activities relating to workpackage tasks

1.1.1 Timeline of activities

A full account of tasks 7.1 and 7.3 has been reported (see corresponding reports). In summary, ethical approval for the study was granted from Sheffield Hallam University ethics committee October 2017. Between October 2017-January 13th 2018 82 older people were recruited from across organisations in Sheffield (Sheff Care, De La Salle Club, Lifestyle Matters Group, Ministry of Craft) to participate in a series of NESTORE co-design workshops WSP (SHU-UK) utilising a research tool (Chamberlain and Craig) named exhibition in a box.

Workshops were transcribed and the data analysed in partnership with 10 older people who had engaged in the workshops (XE WSP1). Thematic analysis identified the following priorities in relation to the characteristics and functions potential end users considered to be important:

Empowerment	Fits my life	Personalisation
Cost	Freedom	Ergonomics
Reliability	Observation	Connectedness
Security	Infrastructure	Being social
Engaging	Keeping active	

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Figure 2: Analysis of findings with the Experts by experience group

In order to ensure that findings from the UK aligned with communities in other countries. The themes emerging from the analysis were presented to participants in the partner countries. The aim was to identify whether these themes were relevant, if any were missing and whether local history, culture and the environment might impact them.

Between January 30th and March 15th 2018 Paul Chamberlain and Claire Craig of Sheffield Hallam University co-facilitated workshops with older people with the support of colleagues in Spain, Italy and the Netherlands (Figure 3). The sessions were as follows:

- January 30th- 31st 2018: workshop with 10 older expert users, Sheffield Hallam University XE WSP1

- February 13th- 15th 2018 workshop with 4 older people, at the Seniornwltijn, Vlaardingen, Rotterdam, Netherlands WSP TuD

- February 19th – 22nd 2018: workshop with 4 older people at Oasi San Gerardo within the La Meridiana Facility, Monza Italy WSP

- March 13th – 16th 2018: workshop with 9 older people at the UAB Universitat Autonoma de Barcelona WSP UAB

- Further workshops with older people in Delft were facilitated by Isabelle Kniestedt between February 13th-March 13th

Figure 3:Testing findings from workshops in UK with partners in Netherlands, Italy and Spain

Initial workshops were held in the United Kingdom to establish methods and following workshops at pilot site had a common approach:

- Description of the methods used by the Sheffield Team,

- Opportunity for partners to participate in a workshop using the methods (as a way of modelling the approach) and validating the themes and findings identified through analysis from task 7.1

- Opportunity to meet with partners to reflect on the experience and share insights and findings.

- Accurate translation of themes

Findings from phase one of the study (documented in report 7.1) were found to be congruent across countries with a few minor differences mainly concerning the politics of how NESTORE might be appropriated (distributed through current health systems and regulations) and a call for NESTORE to be underpinned by research. Indeed, the cost of accessing and using NESTORE to support a healthy lifestyle was a feature of discussion at many of the workshops. Preliminary research in Italy showed that currently the optimal/expected/acceptable price should be about 29€/months for a flat rate service, hardware included as renting option.

Another important aspect of NESTORE will need to relate to data privacy and security. Users are increasingly aware and concerned about their personal data and NESTORE needs to embed high levels of security and allow users to determine what data is shared and with whom. The EU GDPR regulations can provide NESTORE with some pointers relating to this. NESTORE address GDPR and Legel, Ethical, Social and Responsible Research Innovation in a dedicated WP9.

The workshops highlighted and confirmed aspects of life that people determine as important and meaningful. Participants across countries discussed their relation with and opportunities and concerns relating to technology. There were no significant cultural differences however climate and environment should be carefully considered in how it might impact on lifestyles. The workshops were conducted during the winter period with extreme cold weather in UK and NL in contrast with mild pleasant weather in Italy and Spain. This has significant bearing on the ability for people to engage in outdoor activities.

- Build understanding of user requirements of the technology: factors that promote and inhibit use
- Explore potential contexts of where technologies will be used
- Identify priorities regarding the health concerns of this population
- Provide an opportunity for refinement of the methodology in preparation for other phases of the research

The initial NESTORE kick off event in October 2017 also highlighted the importance of understanding the hopes and aspirations of participants to gain insights as to what individuals find meaningful (in order to inform the types of activities and suggestions NESTORE may offer to engage and motivate users of the product).

1.2 Methodology Summary of findings from task 7.1 and 7.2

User requirements as derived from these two phases of the project were as follows:

TRUST:

- Privacy/security/reliability of NESTORE
- The system's management of data is transparent. Users are aware of where data goes and how it is used. The user has control over their privacy settings (in a usable manner and who has access to the data)
- Health related data is accurate and can be viewed in real time by users of the system
- Users have the capacity to turn off analytics (on/off switch)
- The system will translate health data into contextualised user centred feedback appropriate to its audience.
- The system should be robust and withstand everyday use
- The system should not compromise or effect other health technologies of the user (e.g. pace maker)
- Charging requirements should not interfere with lifestyle
- Software updates should not alienate access

COST:

- Affordability
- NESTORE should be scalable (e.g. inclusive core features with option to purchase additional functionality)
- Costs should not be prohibitive to the specified user group.

FITS MY LIFE

- Responsiveness of the system to reflect the needs and preferences of the end user including considerations of ergonomics
- Interface should be clear, concise and elegant with the opportunities for manual customisation by the user reflecting their own preferences and style
- The visual interface (e.g. icons) should be easily recognisable, provide consistent look and feel

- Single sign in (log in once rather than multiple times)
- The system should provide a creative user-friendly solution for log in and resource access
- Users settings should be remembered throughout the platform
- When the user changes the interface settings the interface should be updated immediately and continuously
- Resources should be accessible and usable by all users of the system. Features should include interaction modes for touch and voice alongside high visibility settings appropriate to personal needs (e.g. high contrast for people with visual impairments etc) and language settings/options. Language should be clear and meet the needs of individuals with varied literacy skills.
- The system should be responsive and adapt itself to the environment and user needs
- The system should have the capacity to be used beyond the user's physical home environment

The focus of Sheffield Hallam University has been to transfer these participant perspectives to the technologists (M3-M18) T.2.

1.3. The role of experts by experience

The strength of the approach taken by Sheffield Hallam University is the focus on co-design with all stakeholders. Whilst the original proposal describes the tasks as separate entities through involving partners and engaging with technologists from the beginning of the project has enabled the emergence of a much clearer dialogue. For instance in the first workshop (WSP XE1)in the United Kingdom undertaken with the expert-by experience group Lenoardo Angelini and Maurizio Caon, technology leads from HESSo Fribourg were present during the workshop and engaged with end users to build understanding (Figure 2). Similarly during the workshop in Milan, representatives of FLEX were present. The remainder of this report documents the methods and approaches used to transfer participant's perspectives to technologists.

Key to the transfer of participant's perspectives to the technologists has been the experts by experience group (XE). This core-working group comprises of ten individuals who participated in the initial workshops. In the spirit of co-design the role of this working group has very much evolved through the project. The involvement of these older people has been varied and has to date included:

- Analysis of data and identification of themes within the first phase of the research (XE WSP1)
- Developing user personas (XE WSP2)
- Shaping and validation of the user requirements (XE WSP3)
- Development of materials/objects/media/prompts and tools to enable older people in other countries to communicate their priorities within workshops held by other stakeholders as part of broader work-packages (XE WSP4/5)
- Providers of feedback (more consultation role) of ideas/prototypes developed by the technologists. Ongoing

Between January 2018 and August 2018 this group have met regularly with the design team at Sheffield Hallam University and have been in communication with the wider technologists within the project. It is envisaged that this input will continue to M18 and possibly beyond.

2.Transferability of user perspectives to technologists.

2.1 Digital probes. Experts by experience Workshop 2 (XE WSP2)

The aim of this workshop was to build understanding of design features of current digital interfaces participants find helpful/unhelpful. A digital probe methodology was used. Participants were provided with a 'probes pack' designed and produced by the Sheffield designteam that included a disposable film camera, a tick/cross counter disc, and an instruction booklet (figure 4). Each participant was invited to place counters with either a tick or a cross by particular technology interfaces they found particularly helpful or unhelpful and record with the camera. It was stressed that participants should make comment on the interface of technology rather than the activity associated with the technology. For example watching television might be enjoyable but the interface not.
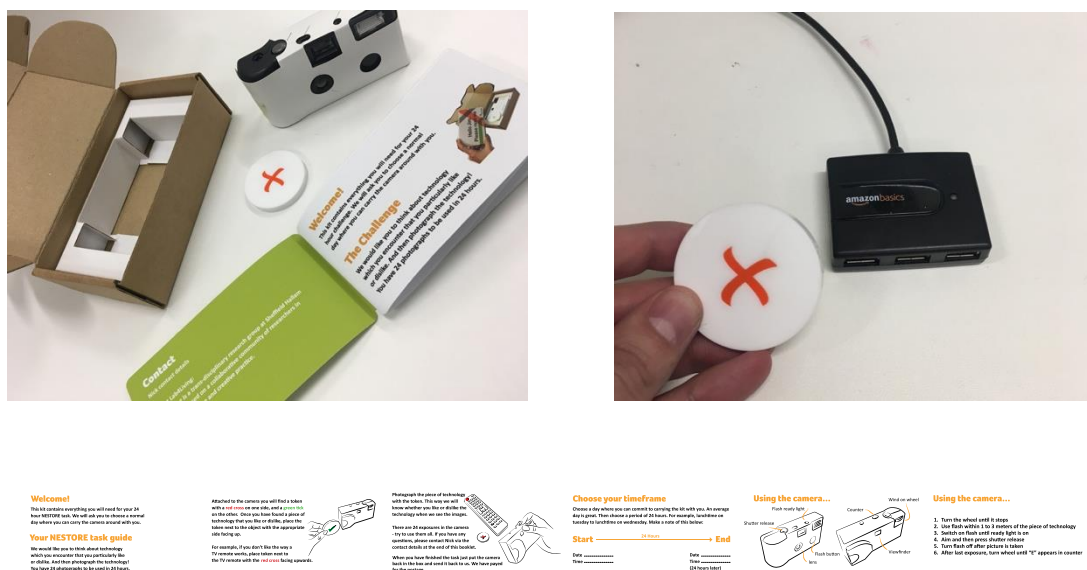

Figure 4: Digital probe pack and instructions for use

Photographs were printed and the results were discussed within the workshop (Figure 5)

Figure 5: Analysis of digital probes XE WSP 4

2.1.1 Outcomes of the workshop

Multiple themes emerged through the workshop in relation to the design facets of existing technologies. Participants commented on the number of digital technologies they regularly interacted with and again questions were raised in relation to the ethics of technology in relation to privacy and the sharing of data. In some instances comments were contradictory.

Within the expert by experience group negative characteristics of existing technologies included:

- The need to have multiple controls to operate digital technologies (for example multiple controls to operate television, DVD player etc)
- Interfaces with buttons requiring multiple hits to scroll through different functions. For example, setting digital timers.
- The intrusiveness of many of the audio-qualities of technology ('indistinct bleeps and piercing sounds)
- Feeling tied to technology – an inability to get away from it
- Participants spoke of valuing particular types of digital technology but struggling with the interfaces (e.g. small numbers, symbols on buttons that are not uniform and which wear away over time)
- There were also questions raised by the group in relation to installation and the need to have clearer instructions in relation to how to use systems
- Poor cable management
- Restrictions in portability were raised by woman who often do not have pockets in clothing.

Positive characteristics of existing technological interfaces included;

- Easy access to information (internet)
- Voice activated. e.g. Siri, Alexa
- Convenience of portability (iPhone)
- Gestural control (light switches)

There were mixed responses from the group with respect to multi-function products. Some people liked to have many functions in one device (e.g. smart phone) however others commented that they often use only a fraction of the functionality on many devices and stressed a desire to choose or customise would be preferable..

The group felt that one of the challenges is that often interfaces are designed without full consultation with end users and there was a sense that the technologists who are designing systems and products do not know enough about the end user. It was therefore decided to create a series of films to communicate to the technologists who the end user of NESTORE might be. This aligned well the user personas developed by others in the consortium.

2.1   Personas. Experts by experience Workshop 3 (XE WSP3)

Over the course of 4 weeks the expert by experience group created a series of films in partnership with the design team at Sheffield Hallam Univerisity. The aim of the films was to bring life to existing personas and to support the technologists in understanding the audience for whom NESTORE would reach. A total of 4 films (figure 6) were created and these formed the basis of a workshop/session within the broader plenary meeting which was held in Sheffield. The films were shared with the full consortium including all the technologists and there was then the opportunity for the technologists to ask questions in a broader panel discussion.
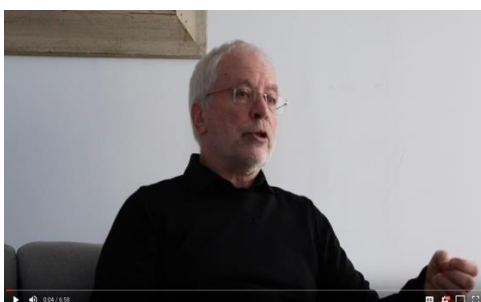
Figure 6: screen shots of ''users lives' videos

2.1.1 Outcomes of workshop

Whilst the technologists found the films of great interest feedback was that it was difficult to relate the overall technology design requirements to such a diverse group within the NESTORE project team and that a system of more simplified personas was preferred. Existing personas that had already been developed were shared with the expert by experience group who were joined by the FAS member and feedback was sought in terms of whether the older people could relate well to the personas that had been created (XU WSP 4). The personas that were shared were felt by both the FAS group and the expert by experience group to be un-representative. It was therefore decided to co-design personas in partnership with older user representatives .

This led to the itterative development of a series of personas (figure 7) developed in collaboration with the project partners and informed by the expert by experience group. This prompted critical discussion concerned with the target user for NESTORE and establishing 'inclusion' criteria based on socio-economic profile and health condition. It was generally felt that NESTORE should be inclusive as possible and provide facilty for potential users at the lower end of the socio-economic scale. However recognising the resource and timeframe of the project it was determined NESTORE might have to be developed in a staged approach providing varying formats and functionality to be able to target diverse social groups. In addition it was felt NESTORE would not target users with chronic health conditions, where users should seek expert medical help, although it could provide additional healthy lifestyle support. However NESTORE will include those with physiological decline as they age that lead to minor chronic conditions.
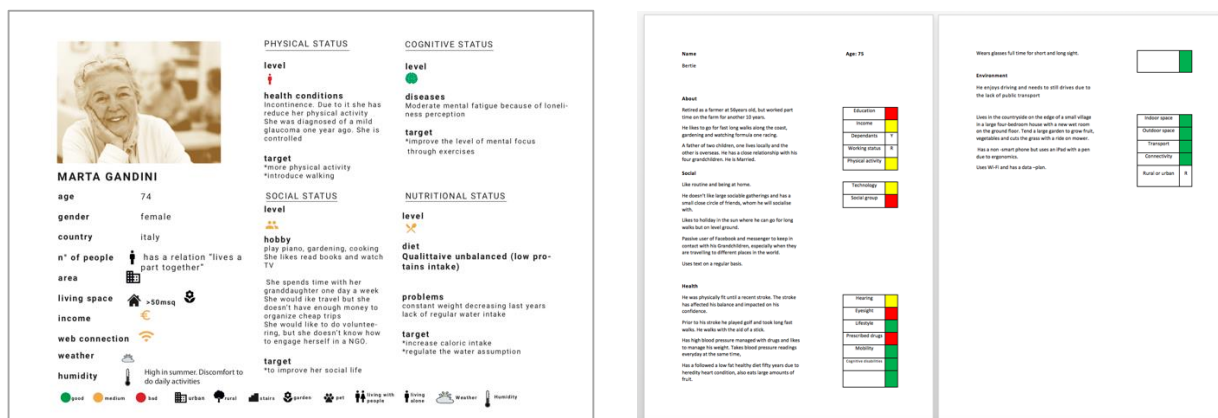

Figure 7: examples of personas (potential NESTORE users)

Although NESTORE is to support improved health it is conceptualised as a coach rather than a doctor. Wheras a doctor might instruct you to take action, a coach should be supportive to help progress the things deemed important from the users perspective. Consequently if NESTORE is conceptualised as a coach it also needs a persona. Deveoped through WP 5 a co-design approach was adopted and informed by WP 7. Four personas were developed and presented as part of WP5. Feedback suggested the personas should provide a better gender and ethnic balance and a further development was presented shown in figure 8. The expert by experience group felt the proposed NESTORE personas

could potentially be seen as patronisong and there was concern that the religious charater persona presented could cause offence to some users.
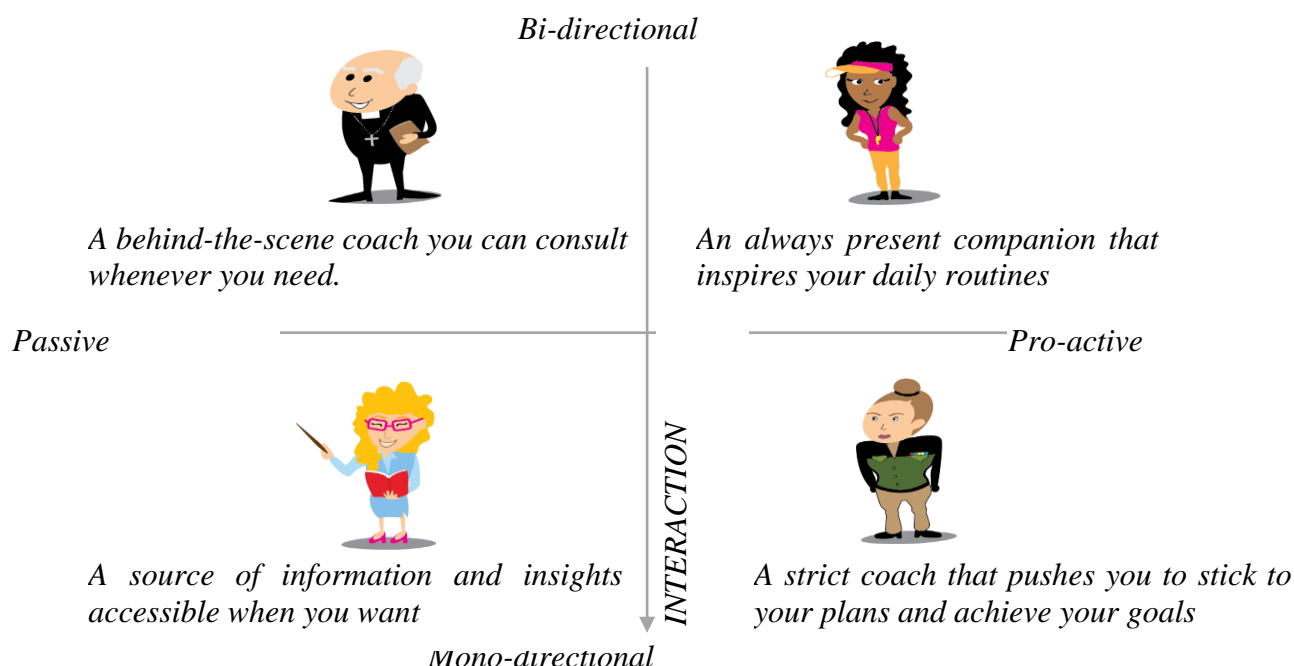

Figure 8: NESTORE coach personas

2.2 Pathways. Navigating through NESTORE. Experts by experience. Workshop 5 (XE WSP5)

The aim of this workshop was to map out the potential pathways NESTORE could provide to guide how a user might navigate the NESTORE system.

User perspectives that have emerged through the workshops to date indicate the NESTORE system could potentially be complex both in the diverse content it needs to offer and the different ways people might wish to access this content. For the NESTORE team to collectively and conceptually understand how the system might operate to facilitate the diverse needs of users, it was decided to apply an analogue approach through the use of physical pathway cards to to enable the expert by experience to map their pathways.

Participants were presented with a series of cards (figure 9) as examples of scenarios of use based on users profile, their needs/requirements and activities. For instance NESTORE would need to undestand who the user is, male or female, and maybe whether the system is being used by an individual or couple. NESTORE needs to understand the intent of the user as to whether they wish or choose to improve their health and engage in familiar activities, or whether there is recognition that a behaviour change is needed and they will need a motivational and suggestive prompt. The range of activities to support healthy life may be offered and suggested through the NESTORE system but there may be a

requirement for users to pro-actively inform the system of activities linked to their interests (a two way approach). The systems intelligence may learn user preferences in time.

The pathways need to be clear to users for them to understand options and how they will easiliy navigate their way to achieving their goal.
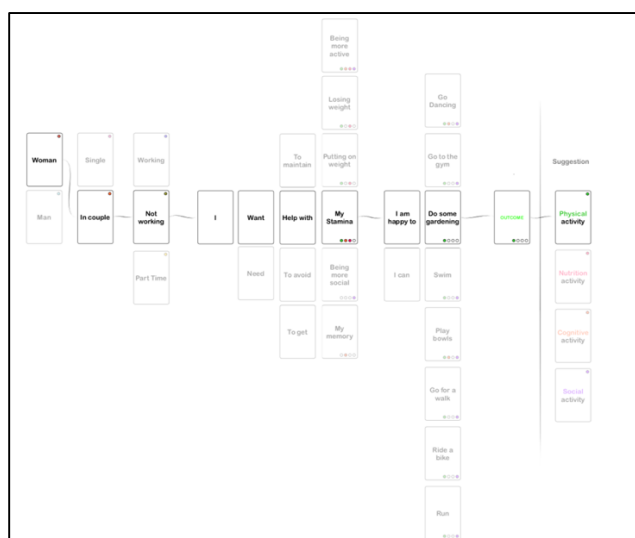

Figure 9: examples of user needs/requirements to illustrate NESTORE pathway of use

Figure 10: Expert by experience group creating pathways through real life scenarios

Based on the example scenarios the expert by experience group were tasked with creating pathways based on their own profile, motivation, activities and interests. The pathway cards helped systematically think through and visually map options and decision points. The expert by experience group worked in pairs in the spirit of co-design.

2.2.1 Outcomes of workshop

The workshop presented opportunity to visualise a systematic approach to mapping out and creating different pathways and scenarios for NESTORE from a user perspective. The pathway prompt cards provided multiple permutations and importantly provided a tangible tool for co-designing the NESTORE system. The Sheffield design team, informed by previous workshops, produced the pathway cards for XE WSP 5. The workshop with the expert by experience group helped refine a second itteration of the card set presented in figure 11..

Man	Woman	Single	In couple	Working	Not working	Part Time	I	Need	Want	Desire	Would like to	Don't want
To avoid	Help with	To maintain	To get	Being more active	My memory	My Stamina	Being more social	Losing weight	Putting on weight	Getting knee strength back		
I can	I am happy to	Swim	Run	Ride a bike	Go for a walk	Do some gardening	Go to the gym	Go Dancing	Go fishing	Play Golf	Go see a play	Go for a walk in the country
Physical activity	Nutrition activity	Cognitive activity	Social activity	Pub quiz	Play Cards	Cook a meal for a friend	Join a new class	We				
Pulse oximeter	Heart rate monitor	Blood pressure monitor	Body temperature	Food Cam								
Weight scales	Nutrition activity	Cognitive activity	Social activity	To find	To finace	Good habits		I can't	I would try	I am compelled to		

Figure 11: Pathway cards developed through a co-design process

The pathway cards were presented to technologists (WP5) who requested a set to help them further deveop the NESTORE pathways. The cards provided an important co-design tool and tangible interface to ensure NESTORE partners from different Work packages adopted a collective and coherent understanding of the complex variables presented by the NESTORE system.

The pathway cards have been used for other co-design workshops in the pilot sites.

2.3   Interface Design. Tangible coach. Experts by experience. Workshop 6 (XE WSP6)

The NESTORE system is currently being developed in parallel across the project partners. Communication and collective understanding is critical and co-design plays a key role in supporting this. The aim of this workshop was to inform the development of the interface of the 'tangible coach' element of the NESTORE system.

The technologists FLEX presented a visualisation of the core main elements of the NESTORE system (figure 12).
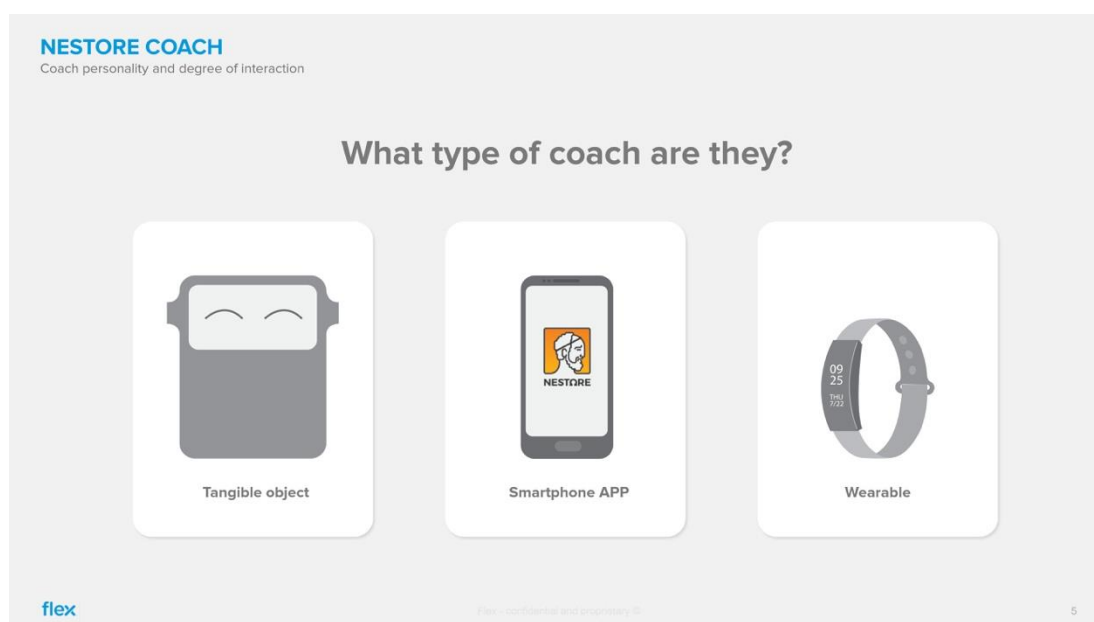

Figure 12: Interactive elements of the NESTORE systems

The expert by experience group were tasked with engaging in a series of workshops to inform the interface design of the tangible coach through co-design activity. XE WSP6 was the first of a number of workshops that will be held over the next six months (M12-18).

Participants were presented with an overview of the NESTORE system to set the tangible coach in context. Key questions relating to the tangible coach were presented as in figure 13.

Figure 13: The tangible coach?

In an attempt to answer these questions participants were tasked with mapping out a 'day in the life'. The day would cover a 24 hour period to include things that might take place in preparation for the next day and during the night. Participants were encouraged present an imaginary day based on activities that might in reality happen over a longer period of time. Partipants included, every day activities (e.g. washing/grooming, eating, cooking , gardening, cleaning) social activities (visiting friends and family) and interests (hobbies). These were mapped on a template created by the design team. Participants worked in pairs and then shared their daily 'stories'.

Participants were the asked to identify how NESTORE might support these different activities. Materials (e.g. pens, paper, carboard) were provided to enable the particpants to create tangible low-fi prototypes to enact out 'their day' (figure 14). Consideration was given to the type of activity (e.g. health related, social, work etc) as to whether the activity was a social or private activity and consideration as to where the activity might take place (e.g. at home, on holiday, 'on the move' etc).

The work shop reflected on the differing forms of interface that emerged from the co-design activity and features the NESTORE system should consider in its design
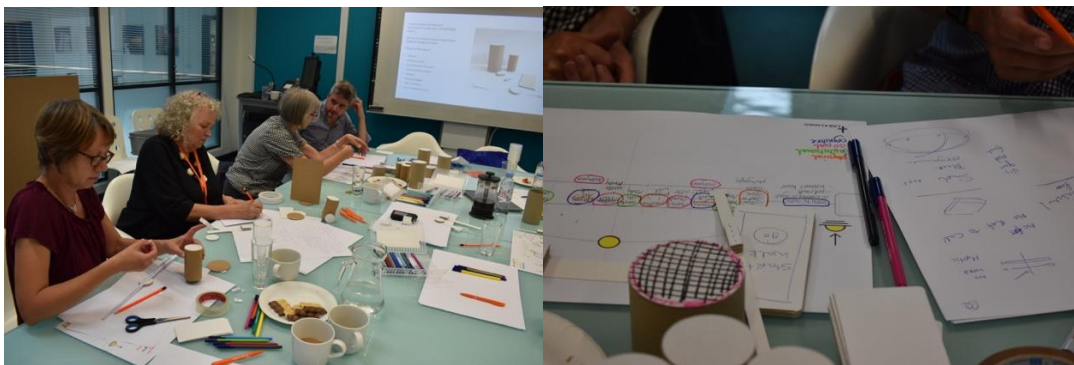

Figure 14: prototyping the tangible interface.

2.3.1 Outcomes of workshop

The main outcomes from EX WSP 6 in conderation of the design of the tangible coach were related to issues concerning:

Appearance

Regards the form of the tangible coach participants felt it should be fit for purpose in consideration of its use and the environment it would be used in (e.g. formal, informal, work and play, at home, on the move).

Particpants commented it; 'Should blend into the environment', ' be camouflaged', 'something beautiful', 'a piece of art'. The expert by experience group concluded the tangible coach should have facilty to be personalised.

Participants commented that 'if talking to the coach it would need a visual point of reference for the interaction like lights'.

Interaction

Participants felt they should be in control, 'telling it (NESTORE) what to do'. They indicated there was opportunity for voice activation to overcome slow typing. They felt strongly the need for the tangible coach to be Gender and Age appropriate, (consideration of hearing loss and deteriorating eyesight and dexterity). Participant suggested the user should invoke engagement (be in control) with the system and the proximity of interaction between the user and the tangible coach should be considered, 'could it follow you?'.

Coaching style

The expert by experience group suggested the tangible coach should be 'a knowledgeable peer', and its attitude might be different and change for different activities. For example an exercise coach (running) might be different to a cooking coach.

Data

Participants felt the data provided by the tangible coach needs to be meaningful and relevant to the user.

2.4   Findings

This work package task (7.2) is currently six months into an 18 month phase but itteratively feeds into other workpackages through a co-design methodology. The co-design workshops undertaken in this phase of the project have adopted a co-design methodology and engaged the experts by experience group through each phase of the research. Through co-design activity in Xe WSP2, Xe WSP3, Xe WSP5, Xe WSP 6 facilitated by the Design team in Sheffield, user perspectives have emerged and been defined that are critical in informing and shaping the form and content of the NESTORE system. The challenge for the project team is how co-design and user perspectives are transferred to the technologists. From the outset NESTORE highlighted its committment to co-design as being core to its methodology. It is encouraging that co-design is being permeated across and through the partners. Co-design manifests itself in many ways; for example through collective identification of needs, co-conceptualisation of solutions, physical involvement in developemnt of prototypes and reflective opinion on ideas presented from others. While co-design is permeating through different aspects of the project and

through the diverse range of partners it is important to reflect upon, define and analyse the type of co-design taking place.

To help translation of both user perspectives and co-design activity to the technologists the development of co-design tools has been an important part of the design teams (Sheffield) contribution. 'Exhibition in a box' (Chamberlain & Craig) was the co-design tool utilised in the first phase of workshops in the UK to identify user needs and values (T.1). The digital probe pack and pathway cards deveoped by the design team and utilised in XU WSP 3 and XU WSP 5 are useful tools that can and have been adopted by other project partners to ensure consistancy of method and help in the context of this task(T.2) translate user needs in a format that is communicable to non designers.

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