# teleWEAR: Engaging Users and Suppliers of Telecare in Product Design

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## Abstract
Telecare is the remote or enhanced delivery of care services to people in their own home or community setting using ICT. Telecare is expected to play an important role in addressing some of the challenges of an ageing population. However, products are often unsatisfactory and a major contributing factor is that suppliers do not typically involve users in design processes. This paper describes a participatory design project involving 25 designers, 6 service users, 11 potential future service users and 2 telecare suppliers: six concept designs were created for a wearable alarm button in two half-day workshops. Our main contribution is to present the design features considered most important to users, which can be incorporated into future product designs and inform other wearable alarm systems for older people. As a result of the project, a leading supplier has invited users to participate in their research and development activities for the first time.

## Keywords
Community alarm service, older people, participatory design, social alarms, social care, telecare.

## ACM Classification Keywords
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

**General Terms**

Design.

**Introduction**

The delivery of health and social care is changing in response to an ageing population. The evolving model of care emphasizes care in the community and preventive care, and high tech solutions such as telecare. Telecare is a term that covers a range of products and services that use ICT to monitor risks and environmental conditions around the home, raising an alert if help is needed.

The most established form of telecare is the community alarm service, e.g., in the UK and Ireland take-up is between 14–16% of older people [5]. The service consists of: a fixed base unit; a portable alarm button supplied with a neck cord, wrist strap or clothing clip, which should be worn at all times for continuous protection; and alarm monitoring. The base unit incorporates an alarm button and is plugged into a home telephone line; pressing the button alerts the Alarm Monitoring Centre that help is needed. Pressing the wearable alarm button anywhere in the house or garden also raises a call through the base unit.

However, research has shown that many people do not wear their alarm button, putting themselves at risk in an emergency [2,4]. In 2009, Moray Community Health and Social Care Partnership (MCHSCP) surveyed 1,324 community alarm service users in Moray, Scotland, on their usage and perceptions of the alarm button with a 60% response rate [10]. The results showed that while users viewed the service extremely positively, almost one-third wore their alarm button only some of the time or not at all, mostly because it was perceived as



**Figure 1.** The aesthetic design of alarm buttons is largely unchanged since their introduction in the 1950s (inset).

too easily activated or they forgot to put it on. Other reasons included not wanting to be a nuisance or to be labeled as vulnerable, and the device is uncomfortable to wear and unattractive (Figure 1).

A major contributing factor to the unsatisfactory design of telecare products is that suppliers do not typically involve users in design processes because they are not usually the customer (purchaser). E.g., in Scotland, telecare suppliers sell large volumes of base units and alarm buttons to Community Health Partnerships (subdivisions of Health Boards) that provide the community alarm service. While this model is an efficient means of delivering product into the service at low cost, there is very limited choice and no direct dialogue between service users and suppliers.

To build on and apply the knowledge gained from [10], MCHSCP engaged in a project called "teleWEAR". The project involved 25 Product Design Engineering students at the Glasgow School of Art in Scotland collaborating with current and potential future users of the community alarm service to create six new concept

designs for the alarm button, together with telecare suppliers. The main contribution of this paper is to present the design features considered most important to users, which can be incorporated into future product designs and inform other wearable alarm systems for older people. We also describe some challenges and opportunities for participatory design for telecare.

## Method

A participatory design approach was employed [6], which has been used successfully with older people and their carers in a health and social care context [1,8].

*Procedure*

Six teams of designers, service users, potential future service users and telecare suppliers participated in two half-day workshops, spaced six weeks apart. The workshops were held at a Glasgow School of Art studio in Moray. To increase peoples' motivation to take part, they were made into pleasurable social events by providing lunch and time for social interaction.

Workshop 1 was designed to discuss problems with the current alarm button and to generate creative ideas. The designers used visual tools, e.g., a journey map, to gather peoples' perceptions and experiences of the device and identify opportunities for improvement. The groups then brainstormed ideas, which the designers sketched and subsequently presented to all six teams for feedback. Back at the studio, each group of designers chose two ideas to develop for Workshop 2.

Workshop 2 was designed to bring everyone back together to evaluate each group's design alternatives. The designers introduced the ideas to all the participants, involving a lecture-style presentation with slides followed by questions and answers. They then discussed the ideas in more detail with four of the six groups in hands-on sessions involving prototypes. Back at the studio, the designers developed the final designs based on feedback from the workshop.

Three weeks later, the final six concept designs and prototypes were showcased to the public in a half-day exhibition, in the town hall near the workshop venue. Visitor feedback was gathered on comments sheets.

*Recruitment*

Service users previously involved in [10] were invited to participate; the invitation was extended to a younger family member or carer as a potential future service user. Health and social care practitioners with indirect experience of the alarm button were also invited in this role. The main suppliers of the UK telecare market were invited: Chubb [3], Tunstall [11] and Tynetec [12].

Eight participants were to be recruited per team to give a range of viewpoints. However, about 70 service users were contacted, of whom seven agreed to participate. The main reasons for declining were health and mobility problems; four out of five service users in Moray are aged 75+ years [10]. Recruitment of suppliers was equally challenging with not a single member of the research and development teams participating: Tynetec did not attend due to work commitments, the regional sales manager from Chubb participated in Workshop 2, and a technical support specialist from Tunstall attended both workshops and the exhibition. Partnering with suppliers and/or building relationships with them at the project-planning phase may have improved their commitment. However, ultimately a new approach to design is needed, as discussed later.
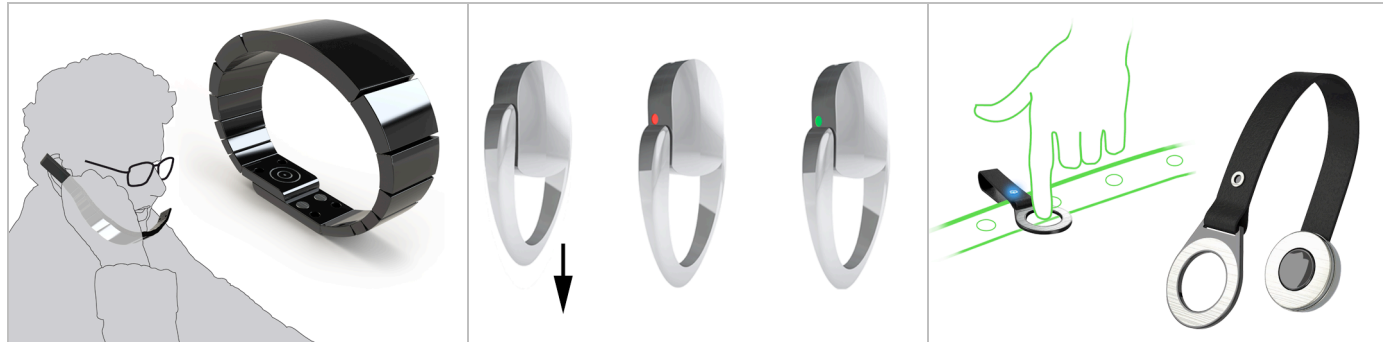
**Figure 2.** Three concept designs (left to right): "SnapBand" bracelet, "Independent" pendant and "The Loop" clothing attachment.

Five service users and ten future service users took part in Workshop 1. An additional service user and future service user took part in Workshop 2. Over 40 people attended the exhibition. A written report of the project was sent to Chubb, Tunstall and Tynetec.

## Results and Discussion

Six new designs were created for the alarm button: "Contact" – a bangle activated by holding its two arcs together; "Independent" – a pendant activated by pulling down a U-shaped grip; "SMARTtouch" – a customizable clip-on attachment activated by finger touch; "SnapBand" – a bracelet phone activated by pulling it from the wrist; "Talisman" – a charm bracelet activated by pressing a charm; and "The Loop" – a magnetic clothing attachment activated by pressing a recessed button (Figure 2).

*Key Design Features*
From the workshop discussions and the final six proposed designs, together with our earlier research [10], we distilled eight key design features for the alarm button:

▪ *Equal appeal to men and women*. Users wanted solutions that appealed to both men and women. E.g., "Contact" featured a unisex aesthetic.

▪ *Status feedback*. Users wanted to be assured that an alarm call had been triggered. E.g., "Independent" featured a red light to indicate a call had been raised and a green light to indicate assistance was on its way.

▪ *Sustainability*. Users were uncomfortable with the current practice of disposing the alarm button once the battery expires because it is more cost effective for the service provider to purchase a new button. E.g., "Independent" featured a rechargeable battery and bedside (night time) illuminated charging dock.

▪ *Reduced risk of accidental activation*. Users did not want to worry about accidentally raising an alarm call. E.g., "SMARTtouch" featured a capacitive touch sensor so it could only be activated if pushed with bare skin.

▪ *Choice*. Users wanted a choice of designs and personalization options. E.g., "SMARTtouch" featured a range of button styles, shapes and colors, with the option of engraving a message or pattern on the front, and a choice of necklaces.

- *Long-range operation*. Users wanted to be able to raise an alert away from their home. E.g., "SnapBand" featured GPS and mobile communication.

- *Attractiveness*. Users did not want to be labeled as vulnerable or wear ugly things. E.g., "Talisman" featured the look of charm jewelry where each charm has a particular function e.g., an alarm button, GPS tracking or microphone/speaker.

- *Simplicity*. Users wanted solutions that presented no difficulty to people with eyesight problems or reduced dexterity. E.g., "The Loop" featured magnets as the clothing attachment mechanism, which was by far the most popular fastening idea.

By comparison, the six designs presented at Workshop 2 that were not taken forward were either more complex, attention attracting, feminine or niche. E.g., an alarm incorporated in an everyday object that the user was unlikely to forget, such as a walking stick, was considered a good idea but too niche.

*Participants' Perceptions of the Design Process*
After the exhibition, a group discussion was conducted with four service users and one potential future service user. The focus was participants' perceptions of the design process. The session was held at the workshop venue, lasted one and a half hours, and was audio recorded with participants' permission and transcribed.

Overall, participants were positive about their involvement in the design process and the new concept designs. They enjoyed and felt valued being able to express their thoughts and felt that the new designs leveraged their insights. E.g., one lady remarked, "I think our conversations inspired them… they've taken up the ideas and improved on them." Participants also enjoyed the social element to the workshops and the opportunity for peer learning. E.g., one lady told us, "It's certainly made me aware of everything. I wear this [alarm button] more now than I used to."

The group reported that while it was mostly the designers generating ideas and solutions, they felt actively involved in progressing the concepts. E.g., one gentleman enthused, "The ideas came along and I said 'Well that's a good idea, couldn't we do this.'" All reported a sense of ownership with the ideas from their own particular group. We speculate that facilitating interaction between the designers and users outside the workshops may have enhanced the collaboration.

*Implications for Design for Telecare Suppliers*
While participant numbers were lower than planned, our observations and participants' feedback indicate that users of telecare want to be involved in the design of products and services. The current distribution model does not though incentivize suppliers to achieve solutions that meet users needs. During the workshops, the suppliers were enthusiastic and contributed valuable information, but often dismissed ideas. In one supplier's view, "At present, the design of the simple alarm button with its current functional scope seems to meet the market needs."

However, the UK social care system is undergoing substantial reform, involving a drive towards greater personalization for those who use social care services ending the current "one-size-fits-all" approach. A key element of this vision is the rollout of "Personal Budgets" in England [7] and "Individual Budgets" in Scotland [9], which give people choice and control over

their care and support needs by allowing them to receive their budget (the funding allocated to them) as direct cash payments. Personalization of social care is likely to have a major influence on the design and aesthetics of telecare products, favoring those suppliers who are fastest to respond to older peoples' rising expectations and aspirations.

## Conclusion and Next Steps

Telecare is expected to play an important role in supporting people to live independently. Thus, it is important that products are acceptable and attractive. The project findings indicate that users of telecare want to and can make a valuable contribution. As a result, MCHSCP has set up an Involvement Group for people living in Moray to contribute to the telecare strategy for the region. Following a review of the project with the research team, Tynetec has invited the Involvement Group to take part in their research and development forums. Participation in these forums has been limited to service providers, marking the beginning of a dialogue between users and suppliers of telecare on the design of products and services.

This paper has presented a list of design features for the telecare alarm button that are considered most important by users. The features can be incorporated into future product designs and inform the design of other wearable alarm systems for older people. Next steps include further discussions with telecare suppliers to develop the proposed concepts.

## Acknowledgments

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