EPSRC
Engineering and Physical Sciences Research Council

GETAMOVEON

GetAMoveOn Network+ workshop:
Using technology to support physical activity in older people

June 27th 2017 from 10am to 4pm, University College London, Chadwick G08

** Please wear your activity tracker such as Fitbit if you have one. If not, please download an activity tracker onto your phone in advance of the workshop **

AGENDA

10.00 Coffee/Tea

10.15 Welcome and introductions

10.30 Nanette Mutrie: Helping older adults sit less and walk more: pedometers; SitFITs and other devices

11.30 General Discussion

12.00 Lunch

12.45 Cindy Gray: STARFISH: a team-based smartphone app to increase physical activity in older adults and stroke survivors

1.10 Paul Curzon: Supporting physical activity as part of intelligent digital management of chronic conditions

1.35 m.c. schraefel: Elder everyday athletes: building resilience

2.00 Coffee/Tea

2.30 Kathrin Gerling: Designing for older users: understanding the relationship between playful technology, physical activity and vulnerability

2.55 Kirsten Smith: Iterative development and modification of a digital physical activity and a diet intervention for older cancer survivors

3.20 Eiman Kanjo: Persuasive technologies for older adults to increase physical activities

3.45 General discussion: future directions

4.00 CLOSE

University of BRISTOL

UNIVERSITY OF Southampton

UCL INTERACTION CENTRE

ABSTRACTS

Helping older adults sit less and walk more: pedometers; SitFIT™ and other devices
Nanette Mutrie

Older adults [here defined as those over 65 years] are the least active and most sedentary age group in the UK. Many health benefits could be achieved, and health care costs reduced, if we can find sustainable ways to help older adults sit less and walk more. In this presentation I will first talk about a nurse-led pedometer-based walking programme which helped older adults, who were recruited from a GP practice, to reduce objectively measured sitting time and increase walking steps. The pedometer was a key motivating factor in the success of this programme [1]. Next I will show the development of a new device [SitFIT™] that can monitor sitting time in the same way that pedometers can monitor walking time. We have evidence from a feasibility trial that the SitFIT™ is acceptable and has potential to decrease sitting time and encourage breaks in sitting time. This is part of a large study which aims to encourage sitting less and moving more for football fans [The EuroFIT project - http://eurofitfp7.eu]. We are now exploring the potential of the SitFIT™ to help older adults sit less. Finally, I will provide some insights into the meaning of sitting time to older adults from an ongoing study – The Seniors USP (Understanding Sedentary Patterns) project.

1. Mutrie, N., O. Doolin, C. F. Fitzsimons, P. M. Grant, M. Granat, M. Grealy, H. Macdonald, *et al.* "Increasing Older Adults' Walking through Primary Care: Results of a Pilot Randomized Controlled Trial." *Fam Pract* 29, no. 6 (Dec 2012): 633-42.

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STARFISH: a team-based smartphone app to increase physical activity in older adults and stroke survivors
Cindy Gray and Lorna Paul

Increasing physical activity (PA) in older adults and stroke survivors has preventative and therapeutic health benefits. We developed STARFISH, a team-based, mobile phone app intervention, in which users' physical activity is visualised by fish swimming. We conducted two pilot studies to explore acceptability, usability and potential effectiveness of STARFISH in older adults and stroke survivors.

Methods: In Study 1, 16 healthy older adults (8 women; age 71.1 ± 5.2 years) used the app in teams of four players for six weeks. Twenty-three people with stroke (12 women; age: 56.0 ± 10.0 years, time since stroke: 4.2 ± 4.0 years), sequentially allocated to STARFISH intervention (n=15) or usual care control (n=8) groups, completed Study 2. Focus groups were used to explore user experience. Objective outcome measures included: steps per day, body mass index, blood pressure and heart rate.

Results: Participants were very positive about using the STARFISH app; they found the self-monitoring, step count targets and visual feedback on steps motivational. Objectively-measured daily step counts increased by an average of 14.1% (9443 to 10773 steps per day) in older adults, and by 39.3% (4158 to 5791 steps/day) in intervention group stroke survivors (c.f. a reduction of 20.2% [3694 to 2947 steps/day] in the control group [group*time interaction p=0.005]).

Conclusion: The STARFISH app was acceptable and straightforward to use. STARFISH has potential to increase PA in older adults and stroke survivors, and a fully powered randomised controlled trial is now underway with stroke survivors.

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Supporting physical activity as part of intelligent digital management of chronic conditions
P. Curzon, N. Fenton, D W R Marsh and A Alomainy

A major impact of chronic disease is often that it restricts physical activity. Intelligent sensor-based technology may be able to help clinicians and patients better manage conditions together to improve this situation. The EPSRC Funded project, PAMBAYESIAN, starting in the summer of 2017 aims to help patients with chronic diseases take day-to-day decisions about their care and activity and so rely less on advice from medical staff. Increasingly, there are low cost and highly portable sensors that can measure a wide range of physiological values. The project will explore how such 'wearable' sensors and other inputs might be combined to improve the way that chronic conditions are managed. Remote monitoring of patients is already in use for some conditions but there are barriers to its wider use: it relies too much on clinical staff to interpret the sensor readings; patients, confused by the information presented, may become more dependent on health professionals, whose work may be increased rather than reduced. The project seeks to overcome these barriers by addressing two weaknesses of the current systems. First is their lack of intelligence which we will address using a method called Bayesian Belief Networks. The second weakness is in mismatches between the design of the technical system and the way the people - patients and professionals - interact. We will work on these two weaknesses together. Case

studies include diabetes in pregnancy, which can be alleviated through exercise, and the management of rheumatoid arthritis, which both restricts physical activity, and where the person's ability to do physical activity and the pain involved is likely to be a critical input to the system.

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Elder everyday athletes: building resilience
m.c. schraefel

One of the key challenges for elders staying in their own homes is self-care. According to Age UK one of the unmet needs of half the elders requiring assistance is to be able to use the toilet and to bath. In many of these cases, elders are too frail to carry out this simple management so important to personal dignity.

Frailty is not a necessary condition for elders. There are at least three opportunities here: (1) work in physiology and kinesiology shows building strength can happen at any age (2) strength building can happen in any environment, without special equipment and (3) intervening with the "pre-frail" to build up strength and strength practices is an optimal approach to redress elders becoming frail. Integrated interactive technologies have a key role to play to support these basic practices.

For instance: an elder who wishes to be able to get in and out of the tub can build related strength from their arm chair by practicing getting in and out of their arm chair. This simple act however introduces a number of exciting research challenges: how to measure progress? How and when to provide feedback? How and when and where to provide reminders for practice? How to personalise support? How to connect movement support to awareness of other related factors like food, social engagement, sleep, to develop an holistic support system? How do these elder athletes make sense of their own progress or challenges achieving progress?

In this short talk, I'll overview how our team proposes to innovate work around sensors, machine learning, sense-making and innovative, tangible interaction and feedback to help elders build and maintain strength and balance in their own homes. I'll describe our co-design methodology to work with pre-frail elders, in particular to design and deliver a virtual coach that will work with them, not to get them fit because it's "good for you" but because fitness and strength align with and enable their values and aspirations to support their autonomy and dignity.

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Designing for older users: understanding the relationship between playful technology, physical activity and vulnerability

Kathrin Gerling

Playful technology holds the promise of engaging older adults, providing both mental and physical stimulation which are crucial for well-being in late life. However, many game-based activity interventions are prescriptive, offer rigid feedback, and generally fail to take into account the individual and the impact that technology-guided physical activity might have on them. In this presentation, I reflect on instances of vulnerability that were exposed across a number of research projects that employed games and gaming technologies to motivate physical activity interventions among older adults. I will discuss the difficult role that playful technology plays in the process of engaging users, addressing idea of challenge in games (and goal-setting on a more general level) and its potential to both help and harm players, and exploring the impact of the setting (e.g., individual or multi-player) in which activity-motivating technology is used. More generally, this presentation discusses vulnerability as one of the key challenges that need to be addressed when creating playful activity-motivating technology for older adults, and outlines potential pathways for future, more intelligent and empowering technologies that could help address some of the ongoing issues.

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Iterative development and modification of a digital physical activity and a diet intervention for older cancer survivors

Kirsten Smith

Cancer survivorship is improving but many survivors have low quality of life. To address this, long-term self-care strategies for cancer survivors should include physical activity and healthy eating. Using digital interventions to promote these behaviours improves reach, availability and cost-effectiveness. The aims of this study were to a) understand how cancer survivors viewed our

physical activity and diet interventions, and b) iteratively modify the interventions based on these insights to improve acceptability, persuasiveness and motivation. We used a Person-Based Approach to intervention development, a behaviour-focused variant of user-centred design. This involved conducting in-depth think-aloud interviews with a sample of older cancer survivors (N=33, median age=68) to elicit perceptions of the interventions. We moved from data collection, to preliminary analysis, to intervention modification, followed by further data collection to discover whether our modifications were successful. A full thematic analysis was completed after data collection completion. uring the interviews we discovered several barriers to physical activity and healthy eating. For example, participants were concerned that activity would increase fatigue, not reduce it. We added light-touch cognitive-behavioural therapy tools to explain that activity avoidance leads to more fatigue and greater disability. Additional issues related to the adequate amount of physical activity, local activity options, social support, and benefits of changing behaviour. Iterative modifications led to fewer concerns and improved acceptability and engagement. Taking a Person-Based Approach to development of digital health behaviour interventions can highlight problems with acceptability and engagement and suggest modifications which can optimise engagement to initiate behavioural changes.

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Persuasive Technologies for Older Adults to Increase Physical Activities

Eiman Kanjo

Many adults aged 65 and over spend, on average, 10 hours or more each day sitting or lying down, making them the most sedentary age group. Research suggests that physical activities are essential for older adults to keep fit and healthy. However, they need motivation and incentives to be active and reduce sedentary be behaviour.

The growing ubiquity of wearable devices and Internet of Things (IoT) integrated into personal and social life, facilitated by expansive communication networks globally, has the potential to have a positive impact on older people's health and wellbeing. Therefore, healthcare professionals are always on *the look for new techniques to motivate them to increase their physical activities.* However, unlike younger generations, older users might be reluctant to use smart phone applications because they find it hard to read or manage regular user interfaces.

There is a need for new forms of interaction that go beyond mobile screens.

In this talk, I will present a range of affordable, simple and persuasive technological approaches which have the potential to 1) increase physical activities by using a spontaneous and intuitive tool 2) blend these activities with other tasks of their interest 3) provide the incentive to be physically active.

These persuasive techniques range from on-Body NFC stickers, accelerometers and GPS embedded in everyday objects and clothes, Bluetooth Beacon and interactive furniture.

Also, I will propose a new technological approach to help increasing physical activities for people who can't (or don't want to) walk based on hand and fingers movements.

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