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Role of wearable activity-tracking technologies in the well-being and quality of life of people aged 55 and over

Conference or Workshop Item

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eSTEeM
The OU centre for STEM pedagogy

The Open University

The 5th eSTEeM Annual Conference

Digital health wearables

Presenters: Prof. Shailey Minocha, Dr Caroline Holland and Dr Duncan Banks

Other project team members: Jane Palmer, Catherine McNulty and Alice Peasgood

Life-changing Learning

Digital health wearables

Activity trackers or fitness trackers



Picture courtesy: <https://flic.kr/p/pifLfu>

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The 5th eSTEeM Annual Conference

What are wearable technologies being used for?

Consumer and Lifestyle



Many of us are wearing more devices to do everyday functions. Real-time information is communicated via watches, glasses, contact lenses, bands, and jewellery. As these devices become smaller, more accurate and comfortable the demand for additional features and longer battery life presents new challenges for designers.

Medical, Healthcare, and Fitness



A variety of companies are progressing rapidly with innovative technology that will improve the quality of life and revolutionise the health and fitness industry. Companies are faced with the challenges of complex end-user equipment designs whilst meeting the needs for higher quality and reliability that the health, fitness and medical markets demand.






Research participants

Five sets of participants

- people who are already using these devices and of any age group
- family members and carers who are using these devices to monitor the health of their loved ones
- people aged over 55 who have never used these devices
- people aged over 55 who have been using these devices for some time
- medical professionals including GPs and healthcare workers



Older users motivations for using wearables

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- the quantified self
- active ageing
- preventive health
- multiple health conditions
- family pressure/reassurance
- insurance?


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Usability problems for older people

- initially setting up the device
- small fonts
- low colour contrast between icons and the background screen
- (perceived) inaccuracy e.g. in step counts and sleep patterns
- difficulty remembering to log information
- difficulty in remembering to use/transfer the device

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Ethical considerations




- Privacy of activity
- Security of data
- Coercion to use
- Valid 'informed' consent
- Legal capacity

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The 5th eSTEEM Annual Conference

What information can we deduce from wearables?

Stress and Recovery Analysis Method Based on 24-hour Heart Rate Variability
Firstbeat Technologies Ltd.

This white paper has been produced to review the method and empirical results related to the heart rate variability based stress and recovery analysis method developed by Firstbeat Technologies Ltd. Parts of this paper may have been published elsewhere and are referred to in this document.

An Energy Expenditure Estimation Method Based on Heart Rate Measurement
Firstbeat Technologies Ltd.

This white paper has been produced to review the method and empirical results related to the heart beat based estimation of energy expenditure developed by Firstbeat Technologies Ltd. Parts of this paper may have been published elsewhere and are referred to in this document.

Indirect EPOC Prediction Method Based on Heart Rate Measurement
White Paper by Firstbeat Technologies Ltd.

This white paper has been produced to review the method and empirical results of an indirect EPOC measurement method developed by Firstbeat Technologies Ltd. Parts of this paper may have been published elsewhere and are referred to in this document.

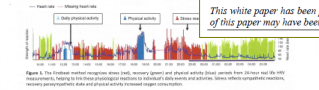


Figure 1. The Firstbeat method measures stress load, recovery level and physical activity. Stress load is shown as a blue area, recovery level as a green area and physical activity as a red area. The x-axis shows time in hours and minutes. The y-axis shows heart rate variability (HRV) in milliseconds (ms).

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What do wearables measure?



- Optical heart rate sensor
- 3-axis accelerometer/gyrometer
- GPS
- Ambient light sensor
- Skin temperature sensor
- UV sensor
- Galvanic skin response
- Microphone
- Barometer

- Haptic vibration motor

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The future use ...



- This emerging area is a rich source of research in a number of areas.
- It is inherently interdisciplinary in nature spanning social sciences, computing, technology and health amongst others.
- The large number of staff and students means that recruiting 'volunteers' is relatively easy.
- The ubiquitous nature of the technology and its relative affordability provide us with a huge number of possibilities in monitoring experiments.
- There are possibilities to use the technology to allow our students to collect experimental data from themselves and to share this with others in a group.
- It gives us the possibility of writing national guidelines for the use of data obtained from wearable technology (NICE, BPS etc.).

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A large blue circular graphic with a gradient, centered on the page. Inside the circle, there is a smaller gray square containing a pink brain illustration surrounded by a ring of diverse, colorful cartoon children holding hands. Below the brain illustration, the text "Discussion and questions" is written in a bold, magenta font. In the top right corner of the blue circle, there is a small blue icon of a speech bubble. In the bottom right corner of the blue circle, there is a small blue circle containing the number "11".

Discussion and questions