Solving real life problems – bridging user needs and engineering for digital health solutions

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XoSoft – Goal & Vision

develop a modular, soft, lower-limb exoskeleton to assist people with mobility impairments

This project has received funding from the European Union's Horizon 2020 framework programme for research and innovation under grant agreement No 688175.

Zurich University of Applied Sciences

XoSoft

Communication and connected health

1 Central processing hub
- Data gathering
- Actuator control
- Communication
- Power

2 Soft sensing and actuation
- Variable stiffness joint
- Multi-joint actuation
- Smart soft mechanical sensing
- Inertial sensors (for 3D kinematics)

Pressure Sensing

Eoin White
www.designfactors.ie, University of Limerick
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Organisation of Workpackages

User centered design

- Smart and soft sensing and actuation
- Monitoring and feedback
- Interaction and control
- Integration and testing

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User Definition

Primary Users
elderly person, people with incomplete spinal cord injury, stroke survivors

Secondary Users
doctor, physiotherapist, carer/family member

Tertiary Users
social welfare, health insurance, policy makers, advocacy groups

Stakeholders
Methods for User Centered Design

Focus groups
Interviews
Questionnaires
Images & videos of prototypes for visualisation
Testing with primary users
Involvement of competent primary users
Differences in Expectations

Primary user: hands-free usage!
Secondary user: use walking aids if prevent falls
Tertiary user / Engineers: irrelevant

<table>
<thead>
<tr>
<th>Design Feature</th>
<th>Strongly Dislike (1)</th>
<th>Dislike (2)</th>
<th>Neutral (3)</th>
<th>Like (4)</th>
<th>Strongly Like (5)</th>
</tr>
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<tbody>
<tr>
<td>Walking aid(s) required during use</td>
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Resolving Differences in Expectations

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Language Barrier

Engineers vs. health professionals vs. users

Basic research vs. applied research vs. commercial interests

Needs effort from all sides

May require years of collaboration
Further Challenges

Technology seen as threat

How far can testing with patients go?

testing of prototypes during therapy sessions?

benefit may only be seen after training
Thank you – Questions?