A team at University College London has been interviewing manual wheelchair users and caregivers that push wheelchairs to understand their needs and expectations in relation to adding power assistance. This information has served to understand the feasibility of adapting an existing power add-on so that it provides an optimal level of proportional assistance and incorporates fuel cell technology to drastically reduce the weight of the device.

Your research, education or innovation snapshot

The Power-up! project has 4 parts:

1. **Manual wheelchair users needs and expectations.**
   Most power assist devices claim to offer assistance during everyday tasks; but in reality they offer assistance under their own conditions, which are frequently not representative of daily situations faced by manual wheelchair users.

2. **Caregivers needs and expectations.**
   Interviews will inform on the usability and appropriateness of current power assist devices for those that push wheelchairs.

3. **Power consumption determination of power assist devices for caregivers.**
   Knowledge of power requirements enable adaptations and/or improvements.

4. **Fuel cell implementation on an electric wheelchair as a proof of concept.**

What is the impact for AT users and other stakeholders?

- Raise awareness of the needs and expectations of manual wheelchair users and caregivers that push wheelchairs regarding power assistance.
- Identify opportunities for researchers to improve current or create new power assistance devices that match the needs of users, are user friendly, functionally and socially accessible.
- Inform industry about current failings of power assistance and ways to improve their future designs.
- The use of fuel cells in AT for mobility can kick start a new generation of power delivery which will enable users to: operate AT for longer time without charging and reduce the cost and the weight.

Implications for Products, Provision, Personnel or Policy?

**Products**
- A fuel cell is constructed using printed circuit board technology and requires no seals and employs very low cost and high-capacity manufacturing techniques.
- The addition of a modular, lighter power source combined with an intuitive interface offers the possibility of a paradigm shift in powered mobility for manual wheelchair users, caregivers that push wheelchairs, electric wheelchair users and possibly any mobility AT that uses batteries.
- User centered research is at the center of Power-up!

**Provision**
- We have identified that current power assist devices fail the needs and expectations of manual wheelchair users and are unaffordable.
- We are encouraging researchers and industry to develop power assist devices that are high quality and affordable.

**Personnel**
Power-up! is raising awareness that manual wheelchair users have greater independence and quality of life when adding power assistance and not when prescribing electric wheelchairs when there is no need.

**Policy**
- We hope Power-up! Helps change policy and include power assist in the provision of AT in NHS UK.
- We also hope that new power assist devices are included in the priority list of AT by WHO.

Implications for other aspects of the Global Research Agenda

- Demonstrate that user centered research and multidisciplinary and multi-stakeholder engagement is paramount for improving/creating AT.
- Demonstrate the need and success of initiatives such as the Global Disability Innovation Hub.

Strategies to share and build global capacity based on this work

We are looking for partnerships to continue Power-up! and integrate fuel cells into power assistance for caregivers as well as improving the usability of existing devices.

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