

Abstract

This Request for Proposal (RFP) addresses the engineering design opportunity regarding the difficulty in zipper usage among those with fine motor disabilities. The seemingly simple act of zipping up a jacket requires numerous fine motor skills, such as bilateral coordination, finger isolation, open thumb web space, pinch strength, hand-eye coordination, and motor planning. [1]–[3] Those with a lack or underdevelopment of the needed skills experience difficulties during the zipping process, resulting in the need for assistance from another person. There are numerous potential causes of fine motor disabilities, including conditions like arthritis, Parkinson’s disease, cerebral palsy, muscular dystrophy, and epilepsy. [4] The target community and primary stakeholder of this opportunity are those whose fine motor disabilities prohibit them from operating zippered clothing without assistance.

A design that allows normal zippered clothing to function as adaptive clothing, assisting the user through the zipping process, would reduce the need for additional aid. The implementation of this device would encourage independence, increase self-esteem, and promote self-expression for those with impaired fine motor control. In response to the needs and wants of the target community, potential designs should ensure affordability, portability/adaptability, accessibility, and aesthetics.

The primary consultant contacted to represent the target community was Dr. Elizabeth Kerr, the Program Director of the Epilepsy Classroom at The Hospital for Sick Children. The Epilepsy Classroom is identified as an Education and Community Partnership Program with the Ontario Ministry of Education, and their goals are to provide a safe learning environment for elementary-grade students with epilepsy by supporting their unique educational and socio-emotional needs. [5] Due to the association of epilepsy and fine motor control impairments, some students of the Classroom often experience difficulty operating zippers. [6] These students represent our target community.

The limitations of existing designs, such as adaptive zippered clothing and external grip/pull devices, include limitations around affordability, portability, and self-expression, or only aid one part of the zipping process. Potential designs should strive to satisfy the provided criteria with the objective to ease the zipping process for those who would otherwise require aid.