Designing and Inventing the Oregon State Age Simulation Suit

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Abstract

Over fifty-four million people reported having disabilities in America. In addition, there are 40.3 million people 65 years and older living in America. As the population continues to live longer and problems with obesity continue to increase, the number of people with limited capabilities will escalate as well. There is a growing realization that disability arises not within the individual due to impairment, but rather in the services, environments, and products that do not take into account varied user capabilities. If people can be excluded by design, they can also be included and enabled by proper, attentive, user conscious design. Researchers at Oregon State University are aiming to gather customer needs from both able-bodied and persons with physical disabilities in order to develop a design methodology that will improve universal design and production of inclusive products. In order to collect the quantity of data necessary for validation, an age simulation suit was necessary. The purpose of this project was to develop prototypes for the fingers, elbows, and shoulders that accurately simulate the physical impairments of elderly individuals and persons with disabilities.

The finger resistive mechanism successfully decreased the average grip strength by 43.5%. The elbow prototype effectively decreased arm strength by 2.4-32.8% in males and 3.5-49.1% in females. Lastly, the shoulder resistive device was designed to be adjustable, which provided the capability of limiting shoulder movements to the average elderly range of motion for various users. When testing the components of the Age Simulation Suit, each of the performance parameters were statistically similar to that of individuals 65-75 years of age and thus validating each of the prototypes.

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