

Design of a Circular Product-Service System for 3D Printed Children's Footwear

Social Context

Finding the correct fit is composed of a physical fit aspect, as well as an identity fit and social fit part. Current footwear solutions require the user to make a compromise between these forms of fit, as the appearance of a product is directly tied to a specific set of inside dimensions and fit. Such compromises can negatively affect foot development and lifelong mobility of the child, as well as their personal identity and psychosocial development. Furthermore, a shift towards online shopping has put the child out of the footwear selection process, possibly leading to further challenges with regards to providing children with well-fitting footwear. Finally, many children are wearing shoes that are too small for too long, as a result of a lack of awareness and communication between children and parents around fit checking between store visits.

Industry Context

3D printing is a rapidly growing field in the context of footwear production, and in combination with computational design and foot scanning tools and algorithms, this allows for a shift from mass production to mass customization of footwear. Additionally, this shift provides new opportunities for the creation of systems and business models that accelerate the shift towards a circular footwear industry.

Design of a New PSS

This thesis presents the design of a new circular PSS for fully 3D printed children's footwear that extends the benefits of mass customization to the target segment of children up to twelve years old and their parents. This PSS consists of three parts: a physical product, an in-store experience, and a mobile service. Based on physical and digital prototype creation and user testing, this thesis suggests that there are tensions between foot health, circularity and the level of product personalization, and that these tensions are both the result of technical challenges, and of challenges related to the perceptions and values of parents. Furthermore, this thesis presents opportunities for the development of a membership based model that aligns with user needs, as well as circular and health values.

