FreeForm

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Problem Statement

According to Michael Ratcliffe, a Podiatrist at Carnation Footcare, shoe with poor grip and inappropriate support can lead to harm of the user. The Borgen Project adds that over 300 million people cannot afford proper footwear which introduces more hazard and danger to the lives of those affected. Modern shoes lack the ability to be adjusted according to the place of use and the user itself. Wearing a shoe that is not proper for the environment can lead to impaired walking, weakened balance, major heel injuries, athlete's foot, and even nerve problems.

Justification

Throughout the world many people face an issue in some way regarding footwear. These problems can range from an improper shoe for the location to being put in danger due to the condition of the shoe. Many cannot readily afford to replace shoes and resort to sub-optimal alternatives or do not make any changes at all.

Our Solution

Our solution is an extension to the already owned shoe which alleviates the struggles of improper shoes by allowing for the shoe to adapt to any environment needed. This is done through nylon straps which attach the rubber sole along with the grip-tape shoe surface to the shoe. The result is a non-slip shoe extension which fits onto various shoes and sizes alike.

Build Procedures

The base of the product is a rubber sole which has been cut to match the shape of a shoe. The rubber sole was then traced onto grip tape and cut to size using a box-cutter. A model shoe was placed on the sole in order to properly cut the nylon straps which were then fitted with plastic buckles. Everything was bound together using a rubber-based adhesive.

Final Prototype

Similar Solutions

The Classic Clog ($49.99)

Pros	Cons
- Lightweight - Fits multiple foot sizes - Easy maintenance	- Poor heel support - Wide body could hurt narrow feet

The Shoe That Grows ($20.00)

Pros	Cons
- Adjustability - Light weight - Low material cost	- Availability - Not fully secured

Testing Methods

1. Strap Stability
   - Tests the effectiveness of strap design. Ensures that shoe will remain in place to work properly.
2. Cold Durability
   - Confirms that product will withstand freezing temperatures.
3. Heat Durability
   - Ensures that product can withstand intense heat and not melt.
4. Tensile Strength
   - Ensures that product can withstand intense force and regular use

A	B	C	D	E-F	G	H	I	J	
9/27/21 Business Plan & Problem Justification	10/7/21 Documentation and Analysis of Prior Solutions	10/18/21 Presentation & Justification of Design Requirements	11/1/21 Design Concept Generation, Analysis, and Selection	11/16/21 STEM Principles & Consideration of Design Viability	1/5/22 Construction of Testable Prototype	1/28/22 Prototype Testing & Data Collection Plan	3/1/22 Prototype Testing & Analysis	3/21/22 Documentation of External Evaluation	