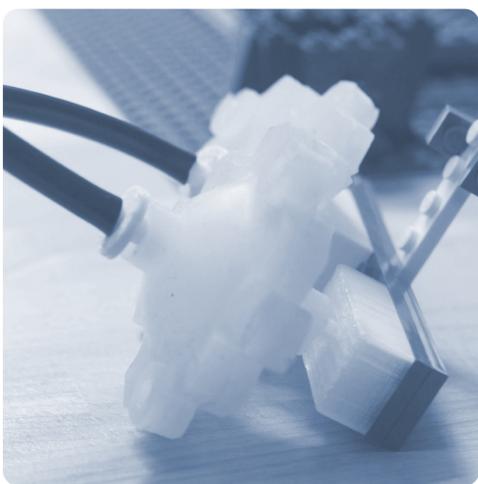


Here the participant is shown to be making the custom body movements using the functional prototype of Silly Stompers.



Soft actuators for which custom interconnectors are designed to integrate with LEGO and also being made possible to stack multiple of these in various arrangements to provide more open ended play



Demonstration of how the soft blocks are pushing the functional prototype forward to create the necessary movement.

# Silly Stompers

## Using soft robotics as a medium for gender accessible STEM education of preschoolers

Only 35 percent of the recent graduates are women. The figures are even lower for traditionally male dominated workforces such as engineering and robotics as women constitute only 12 percent of the engineering workforce. It is quite evident that we cannot ignore the gender equation when it comes to bringing in more equity in the workforce. As even the toys are heavily gendered, to take an example. Right from the way girls are prompted to play with **Barbies** and boys with **G.I. Joes**, this societal conditioning influences their future interest towards professions.

Which explains the possible gaps in the gender equation with respect to **STEM professions**, especially robotics.

There was an initial research exploration on various concept drivers such as educational play, open ended play, screen free and gender-accessibility itself to design a medium to tackle this issue through a play-based learning approach.

Owing to the closeness to the rationale behind the thesis itself, **GENDER ACCESSIBILITY** is selected as the key concept driver. The medium of soft robotics is investigated for it being stereotype independent and for its possibilities of various tangible expressions.

In **OPEN ENDED PLAY**, the philosophy of constructivism is explored with LEGO as a case study. And how robotics could contribute to the holistic development of the child

In **SCREEN FREE**, the disadvantages of screen dependence are explored along with the current trend in screen free alternatives for various traditionally digital experiences is explored.

In **EDUCATIONAL PLAY**, the investigation goes a bit deeper, into the minds of children themselves. How do they think? What do they learn? What do they like to play with? These are the fundamental questions which are explored to shed some insights on the necessary design requirements which can help in ensuring that the designed product satisfies the learning outcomes.

Coming to the product itself, **Silly Stompers** enters neatly into this niche of soft robotics education, and could be a valuable entry into the toy market for 4-7 year olds.

The story of the Silly Stompers revolves around the ocean bed with these three characters who stomp their way through the ocean bed. As they pump air into the blocks in various sequences, it comes to life and performs various animations through its stomping motion.

**Silly Stompers** consists of a base which can connect to various soft actuator blocks. Children involve in open-ended play by performing a wide variety of functions through pushing, pulling, bending and extending by means of the **soft actuator blocks**. These blocks can also be stacked with other such blocks creating interesting locomotion patterns through which the children not only learn the basics of soft robotics but also involve address learning outcomes through constructive play, role play and storytelling by means of the characters themselves.

Currently, by means of LEGO connectors, it integrates easily with various LEGO building blocks helping in more open ended possibilities. In the future scope of development, it could be interfaced with SCRATCH to provide more possibilities through **blended learning**.