From Textiles to Soft Robotics and the Emergent Approaches in STEAM and Textile Labs

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The Future of Education 1 Juli 2022

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101006203.

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FABRICADEMY
textile and technology academy

The intersection of textiles, digital fabrication and biology.

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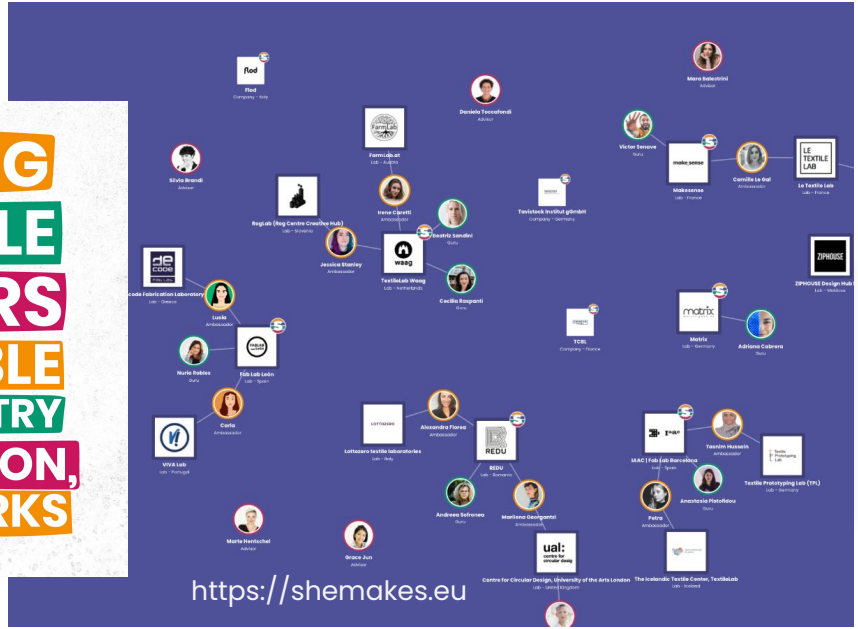
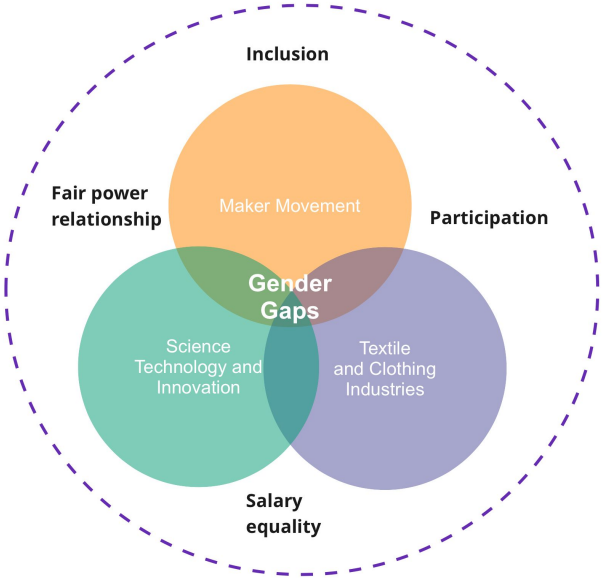
About the shemakes.eu Project

EMPOWERING FUTURE FEMALE INNOVATORS OF THE SUSTAINABLE FASHION INDUSTRY THROUGH INSPIRATION, SKILLS AND NETWORKS





TCBL

FABRICADEMY textile and technology academy

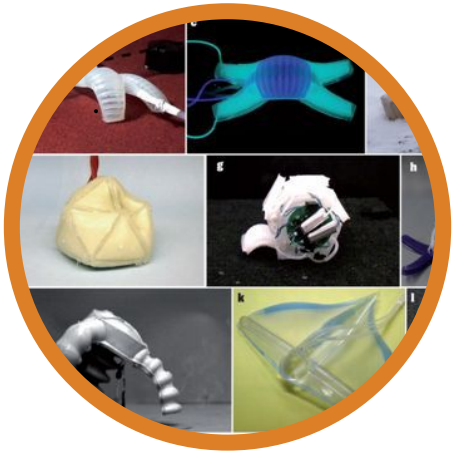
This is about:

1. **Introduction**
   Soft Robotics in Education
2. **Framework**
3. **Findings and discussion**
4. **Conclusions**

1. Introduction

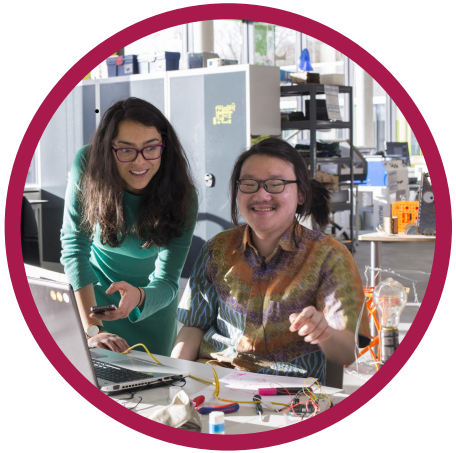
Learning Path in Soft Robotics

Biomimicry



Materials & textiles

human-machine Interaction



FabLabs

2. Framework

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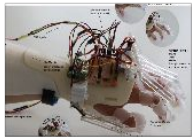
Fabricademy curriculum

State of the Art
WEEK 1

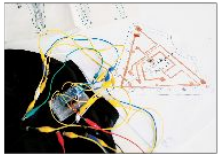
Bio Fabricating Dyes & fabrics
WEEK 4

Textile as Scaffold
WEEK 7

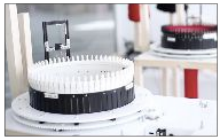


Implications and Applications
WEEK 10

Digital Bodies
WEEK 2



E-Textiles and Wearables I
WEEK 5

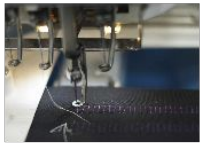


Open Source Hardware
WEEK 8

Soft Robotics
WEEK 11

Circular Open Source Fashion
WEEK 3

Computational Couture
WEEK 6



E-Textiles and Wearables II
WEEK 9

Skin Electronics
WEEK 12

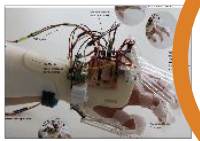
Fabricademy curriculum

FABLAB Kamp-Lintfort
HOCHSCHULE RHEIN-WAAL Rhine-Waal University of Applied Sciences
FABRICADEMY textile and technology academy

State of the Art WEEK 1

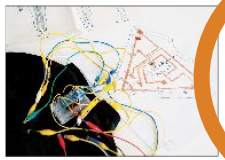
Bio Fabricating Dyes & fabrics WEEK 4

Textile as Scaffold WEEK 7

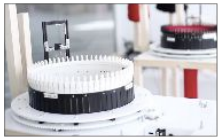


Implications and Applications WEEK 10

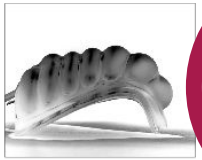
Digital Bodies WEEK 2



E-Textiles and Wearables I WEEK 5



Open Source Hardware WEEK 8



Soft Robotics WEEK 11

Circular Open Source Fashion WEEK 3

Computational Couture WEEK 6

E-Textiles and Wearables II WEEK 9

Skin Electronics WEEK 12

FInal Projects Prototyping and scale

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A wearable to combat anxiety and induce calmness

Spatial exploration: in social awareness

Artistic expression imitating animals that are capable of voluntary self-transformation

Interactive costume for performance

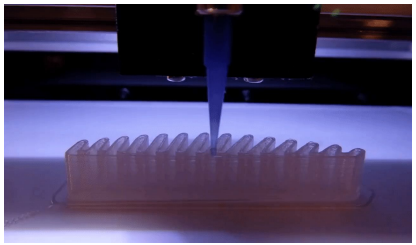
Functional and aesthetical exploration of the hood

Exploration of cup fit using inflatables; adaptation on an existing textile product (bra)

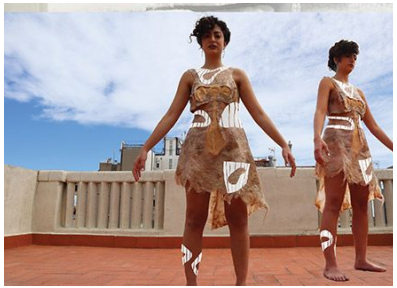
TPU

moulding and casting

3D printing



Biomaterials

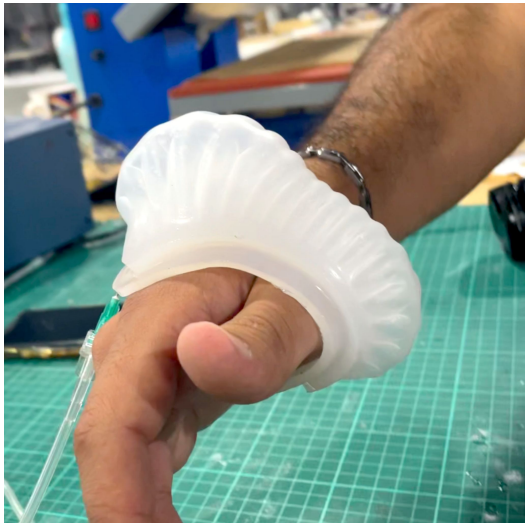


Workshops

From Soft Robotics to Biobotics
Fab Conference Greece 2021

Big surfaces
Royal Academy of art Haag

4D Soft Matter
Techworks FabLab Crown Prince Foundation



3. Opportunities and Discussion:

Soft Robotics in Educational Practices at Fabricademy and Labs:

The aim is to grasp the concept of how the intersection of engineering and soft materials adapts to the **"making"** in the labs, exploring the principle of softness from soft wearables for inclusive design , fashion and art to large scale explorations. Below we will highlight some of the essential topics in the lecture on Soft Robotics by introducing the key challenges.

Bio-inspired Design:

Soft Robotics within the field of Biomimetics : function and movement in nature.

flexible and conformable shapes making and manufacturing of components and materials. Biomimetics explores the embodiment of function

biologically informed design has the potential to enable a circular, sustainable and renewable design practice from the beginning of the development process

Learning by doing:

Involving the hands-on approach to understand what kind of methods and strategies in CAD and CAM can be applied in the development of Soft Robotics

Soft prototyping the making, hacking, and fabrication of projects that demand flexibility, allowing for an innovative form of communication and interaction.

3. Opportunities and Discussion:

Material driven design:

This development includes not only the use of machines but also an in-depth study of materials such as paper, textiles, biomaterials, electronics, and their applications, which can be explored in the FabLab.

by using biological strategies to generate intelligent materials or bio-composites. Fabrics and materials with a history and identity apart from their appearance and functionality also reflect circular design principles

Wearables in bridging the gender gap:

Soft Robotics enables a space where there can be different responses to wearables that converge in practices that facilitate constructive learning, allowing a safe space for experimentation.

Wearables in bridging the gender gap:

HCI

actuated and/or stimulus-responsive materials such as those used in Soft Robotics worn on the human body provide an immediate, individual and immersive experience with technology which could offer new insight into Science and Engineering principles.

Combining Skills

importance of combining the skills of textile craftsmanship, such as sewing, embroidery, knitting and weaving, with embedded electronics provides an inclusive understanding of other fields such as engineering and computer science.

STEAM and Labs

In recent years, women's participation in STEAM (Science, Technology, Engineering, Arts and Mathematics), biotechnology and textiles have increased thanks to a more diverse offer with programmes such as Fabricademy, Poderosas [14], Fabrication for Care[15]. They have promoted diversity and the engagement of women interested in the creative areas of design and fashion and the implementation of new digital fabrication technologies.

4. Conclusion:

Welcome Differences

combining ‘making’ and Soft Robotics enables a safe environment and invites exploration without certainty of what the end result will be, **no right or wrong.**

Inspiring

the individual's experience, understanding the principles of actuation and reaction in Soft Robotics, engages the user in immediate interaction with the material and the important critical reviewing functions such as bending and strain mechanisms

Emotional Exploration

this practice enables the exploration of cognitive and emotional features in prototyping for different disciplines. Playground for learning new abilities

4. Conclusion:

Collaboration

Soft Robotics allows the exploration of narratives of nature and the gap between electronics, technology, and science

Inclusivity

The topic brought the attention of different audiences regardless of gender and age and invited the participation of all levels of knowledge.

While in the workshops, most of the audience is mixed, a bias can be noted that the majority of participants who choose soft robotics as their final topic are women.

Empowerment

how to promote activities around the empowerment of the use of technology, learning by doing and innovating in the intersection of technology, science, and art.

Conclusions

STEAM and technology in non-formal educational programs

Their development in the fashion sector can be very attractive and demonstrates the migration and influence from science to prototyping development and commercialization of Soft Robotics products. Therefore, it becomes more relevant to facilitate access to manufacturing tools through laboratories and educational practices such as the Fabricademy program and future activities in this field.

Reinterpretation of industries

Soft Robotics and actuated materials can (re)shape the implications and applications of wearable technology in education and (re)define emergent approaches in the textile and clothing industry.

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Thank you

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