D-CAY: SHOES THAT LAST A SINGLE STEP

Sjuul Hermens
Eindhoven University of Technology
Eindhoven, Netherlands
s.a.hermens@student.tue.nl

Sander Pardoel
Eindhoven University of Technology
Eindhoven, Netherlands
s.p.a.pardoel@student.tue.nl

Tom Uijlenhoet
Eindhoven University of Technology
Eindhoven, Netherlands
t.uijlenhoet@student.tue.nl

ABSTRACT

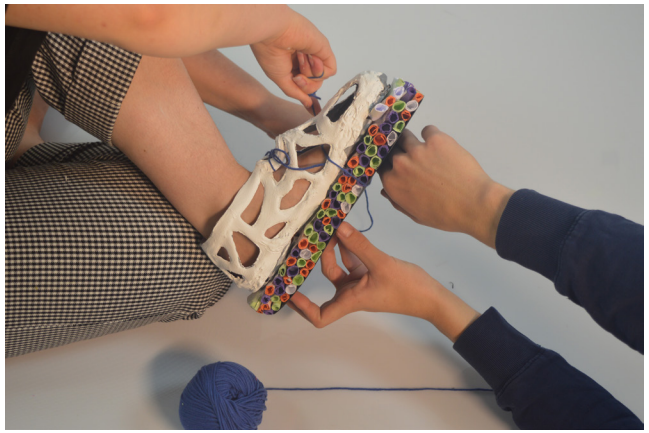
The fast fashion industry produces shoes that are designed to break easily, so that customers have to keep buying new ones. This is a worldwide problem that is extremely costly for the environment, increasing waste and exhausting natural sources. Creating awareness can help address this problem. In this project, a critical design approach is followed; experiments are iterated on and their qualities are determined through user testing. The result is a collection of shoes that decay within the very first step that you take with them, named D-CAY. Through videos of these shoes showing the destruction that they undergo, we aim to provoke thought about the issues behind the fast fashion industry. Through expo's and social media, awareness can be created among a wide audience.

INTRODUCTION

Of the 100 billion garments produced each year, 92 million tonnes of clothing ends up being thrown away. To put things into perspective, this means that a truckload of wasted clothes is dumped every second. (Igini, 2022). In the fashion industry, fast fashion is a well-known phenomenon. Many fashion houses sell poor quality clothing for low prices. These clothes usually do not last long and are worn out after just a few uses, to the point where the owner no longer wants to wear them and throws them away. This is the business model of the fast fashion industry. They produce clothes and shoes that are designed to break easily, to keep you buying new ones. According to research from Morgan and Birtwistle, fast fashions are constructed so that they typically last no more than 10 wearings. (2009). Partly due to this, more than 8 percent of global greenhouse-gas emissions are produced by the apparel and footwear industries. (Quantis, 2022). This is a worldwide problem that is extremely costly for the environment, increasing waste and exhausting natural sources. Therefore, we are creating a statement against the current fast fashion industry.

PROJECT GOAL

For this project, our objective is not to solve this problem directly, but to introduce the audience to the problems in the current fast fashion industry. Through a critical design approach, we have been looking for a way to make a statement, drawing attention to our cause. To show the principle of poor-quality clothing that can only be worn a few times, we wanted to develop a garment that only lasts for an instance, becoming unwearable within its first use. To add to this effect, we looked for exaggerated, extreme degradation. Looking at our everyday clothes, our shoes experience the most intense wear. And since there was already a growing interest in shoes within our project, we focussed on shoe design. Our statement piece against the fast fashion shoe is a collection containing multiple iterations of shoes that we have designed to break in a dramatic fashion within the first step that you take with them. This is meant to be a provocative design, making people aware of the problem we are addressing. Through expo's and social media, we aim to reach a broad audience and make everyone aware of the issues behind fast fashion shoes.



RESEARCH

The fashion industry is highly greenhouse-gas intensive, with estimated emissions ranging between 2 and 8 percent of the global total (UNECE, 2018). Cotton for the fashion industry uses about 2.5% of the world's farmland and synthetic materials like polyester require an estimated 342 million barrels of oil every year (BBC, 2022). These kinds of issues with the current fashion industry are at the heart of this project. According to Verified market research(2022), Fast Fashion Market size was valued at USD 122,257.5 Million in 2021 and is projected to reach USD 283,457.5 Million by 2030, thus more than doubling. The aim of this project is to create more awareness to counter this.

The idea that the growth of the fast fashion industry can be stopped by creating awareness through negative publicity is substantiated by the article 'The power of negative publicity on the fast fashion industry' by Irene Roozen and Mariet Raedts(2020). The study shows that 'negative publicity about the environmental impact and working conditions of the fast fashion industry significantly negatively influence consumers' attitudes towards the fast fashion industry. The "power" of negative publicity is also significantly stronger than that of positive publicity and is enhanced by the consciousness of consumers towards the social and ecological impact of the fashion industry.'

The study 'Provocation in advertising: A conceptualization and an empirical assessment' by Richard Vézina and Olivia Paul(1997) assesses the effect of provocative advertisements on consumers, and evaluates the impact if not the effectiveness of provocation as an execution strategy. It states a 'tentative conclusion concerning the impact of provocation in advertising would be that provocative appeals do lead to increased awareness with lower exposure'. Together, these articles have acted as underpinnings for the value of our provocative approach.

For this project a critical design approach would be used. Dunne & Raby, an English design studio that specialises in critical design, states that 'Critical Design uses speculative design proposals to challenge narrow assumptions, preconceptions and givens about the role products play in everyday life. It is more of an attitude than anything else, a position rather than a method.' (dunneandraby.co.uk, n.d.).

The articles 'What is "critical" about critical design?' by Jeffrey Bardzell and Shaowen Bardzell (2013), Anthony Dunne's and Fiona Raby's 'Speculative Everything : Design, Fiction, and Social Dreaming'(2013) and 'Critical Making: Conceptual and Material Studies in Technology and Social Life' by Matt Ratto(2011) give a better understanding of critical design and how it can be used. 'Material speculation: actual artifacts for critical inquiry' by R.L. Wakkary, W.T. Odom, S. Hauser, G. Hertz and H. Lin(2016) takes a closer look at material speculation in critical design, as was also used within the project.

(Balenciaga's "Fully-Destroyed" Sneakers, 2022)

Balenciaga's campaign promoting a series of destroyed sneakers served as inspiration to create a shoe that decays within just one step. Balenciaga's destroyed shoes '"suggest that Paris Sneaker are meant to be worn for a lifetime" - a point that feels especially relevant amid growing conversations around the fast fashion industry and the impact of overconsumption on the planet'. (CNN, 2022). Here, the fashion brand is also making a provocative statement against the fast fashion industry.

(A Measurable Factor Sets the Conditions of Its Operation, 2013)

A Measurable Factor Sets the Conditions of its Operation (2013), an exhibition in which Marloes ten Bhömer 'exposes and questions the role high heels play in the cultural construction of female identity by considering 'the woman in motion' as an engineering problem', formed inspiration not to use a physical shoe as a statement, but to use video footage of the shoe breaking down.

The Nature of Motion, a Nike exhibition at Milano Design Week 2016 showing explorations in Natural Motion inventions that rethink materials, has provided concrete inspiration for the aesthetics of the videos for the statement. Nike uses the same white Flyknit upper and the same white, almost plain background each time in this exhibition. This emphasises the alternating soles, which often have bright colours to stand out even more. These tricks were also used in our final videos.

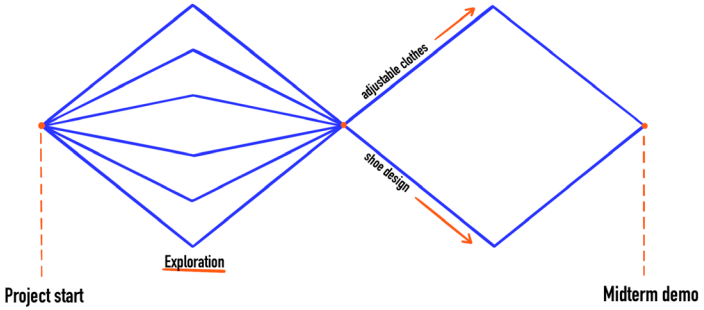
To make the bone-like upper of our shoes sturdy and flexible at the same time, research was done to find the right structure for this. From this research, the Voronoi pattern, which derives from the observation of natural structures, emerged. In a Voronoi pattern, 'every point within a given region is closer to the center of that region than it is to any other point outside that region'. (MSI Chicago, n.d.).

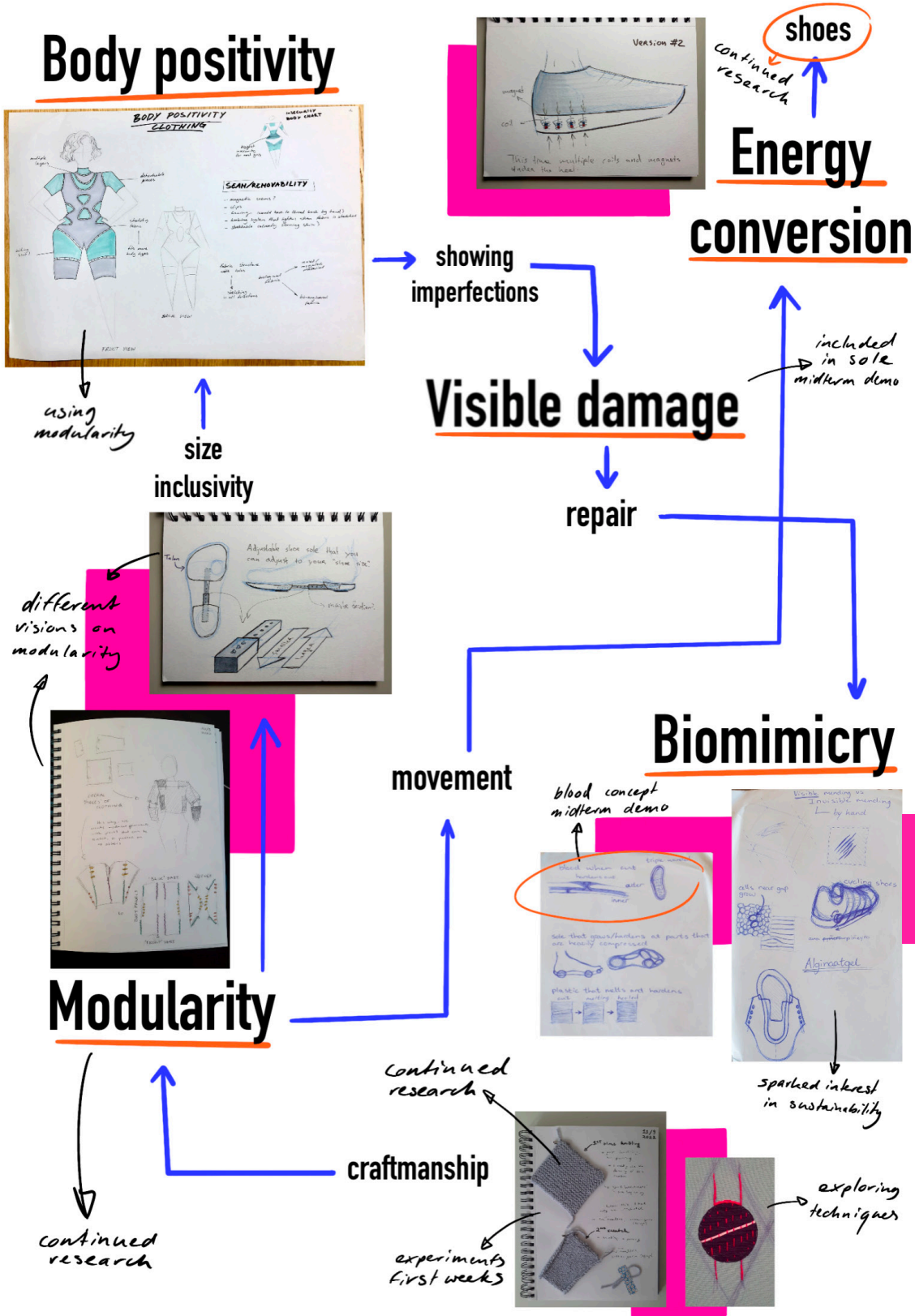
(Nike Experiments in Natural Motion, 2015)

PROCESS

At the beginning of the course, we were encouraged to explore new techniques and play around with them. We worked on skills like crochet, knitting, and embroidery. At the same time, we were looking into various directions to take the project. After a few weeks of independent exploration, we came together and mapped out our current ideas and their relation to each other. Looking back from our contemporary perspective, these topics formed the initial sparks for some of the elements of our final project, even though we did not take them directly with us. Biomimicry and energy conversion showed our early interest in sustainability and visible damage formed the base for our research into the aesthetics of decay.

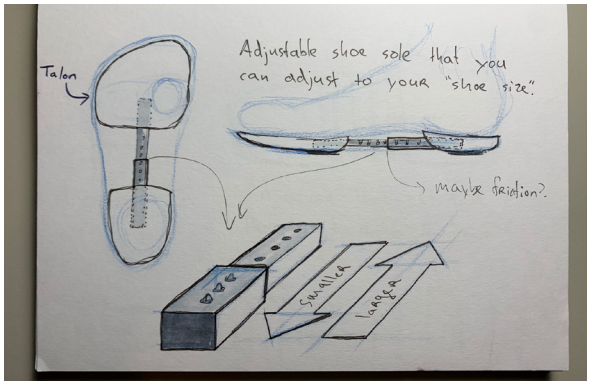
After getting together and organizing our ideas, we continued working on the two most prominent ideas; adjustable clothing and shoe design. After deciding neither of these topics had to be removed from consideration, half of the group focused on shoes, the other half on clothing.



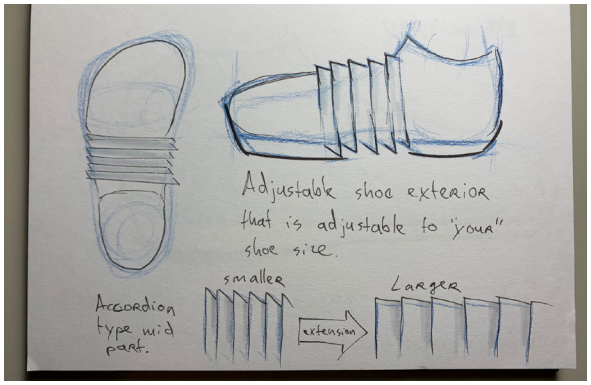


SHOES

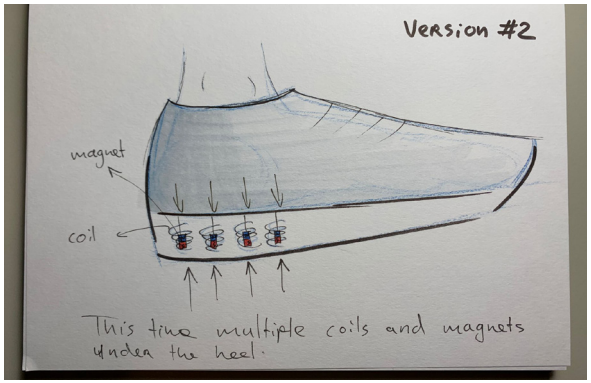
The two group members who focused on the shoes did research on the construction of sneakers, made sketches, started actuating them and looked into the opportunities of sneaker design. The first ideas included shoes that are adjustable in sizing. We looked into possibilities for this adjustability, both for the interior and the exterior of the shoe. After that, we decided to combine shoe design with our initial concept of energy conversion by designing shoes that could convert movement into electrical energy.



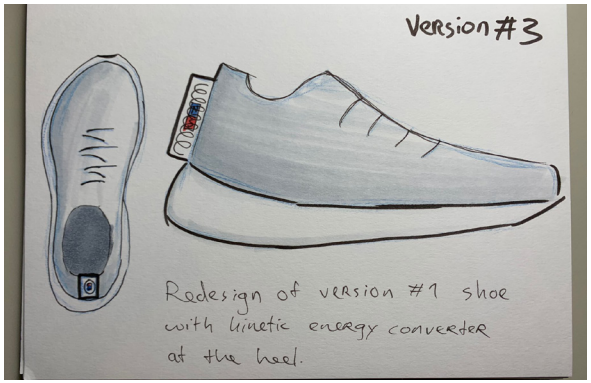
Adjustable shoe - sole



Adjustable shoe - upper



Energy conversion through sole



Shoe with energy converter at heel

ADJUSTABLE CLOTHING

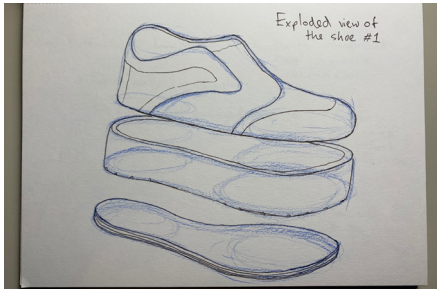
Our other project focus was adjustable clothing. For this topic, we took an approach directed at soft materials and craftsmanship. We performed research on biomimicry and experimented with various materials and crafting techniques. Our primary methods were knitting and crochet, because of their versatility in patterns and stretch factor.

Knitting samples - various patterns

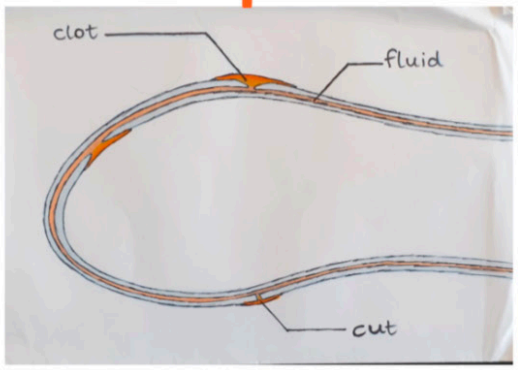
After a few weeks came the realization that the group was working on seperate projects. The group came together and figured out how to harmonize what each individual had been working on. The conclusion was that certain topics would be excluded, laying the focus on visible damage and reparations, modularity, and biomimicking. This was a push into the right direction but communication remained lacking.

MIDTERM

At midterm demo day, it was decided to show all of our focus points through three different techniques, implemented in one shoe. We did this in order to be able to receive feedback on all directions, creating a better vision on what direction to explore further.

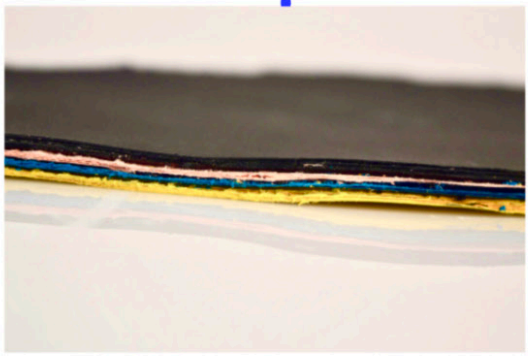


Our upper design was based on a stretchy crochet structure, making the shoe adjustable for different sizes and shape inclusive. This idea was meant to prevent the overconsumption of shoes. We got feedback that this was a nice idea, but that our other design ideas were slightly more exciting.



Our midsole design was also meant to show damage, in addition to a self-repairing mechanism imitating the human body's blood coagulation. This midsole design has a double layer with a red colored liquid inside that would solidify when it came into contact with the air, for example after a crack in the midsole. At midterm demo day, this topic received us the most attention and controversial discussions, as it resembled bleeding.

The bottom of the sole contained a jawbreaker effect. In other words, the bottom of the sole had multiple layers, each with different colors. After a while of usage, the shoe sole wears out and a new color layer appears. On midterm demo day, this design was shown as a low-fidelity prototype made of thin layers of spray-glued paper sheets in the shape of a sole. This design was meant to show the beauty of damage and motivate people to use their shoes longer.



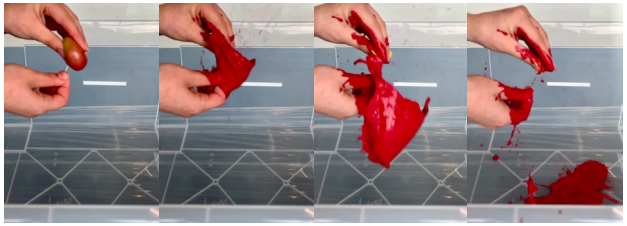
BRAINSTORM TO IDEA

After midterm demo day, we met to discuss future steps. We received the feedback that our concept was not coherent, and since we felt this ourselves as well, we had to define new building blocks for the project. After brainstorming, we leaned towards a more provocative approach; emulating designer brands and designing a pair of shoes with a certain shock factor, leaning towards constructivist art.

Earlier in the project, we learned that offline meetings where we sit together to brainstorm, discuss and share new ideas on a big piece of paper really helped us in keeping our vision focussed. Moreover, we learned that the online meetings for brainstorming were not effective for us, as it took way longer for us to communicate our designs. Later in the project, we learned to use programs like Miro to make these sessions more effective.

EXPLORATIONS

During our ideation process, we looked into magnifying the issues we have with the fast fashion industry. To create a provocative piece, we explored the opportunities of unidirectional shape change. In other words, we wanted to design shoes that only last one step. We made sketches to ideate and tried to explore the opportunities. We filled balloons with various liquids, melted candle wax over our shoes, covered soles in sugar glass and took a step. Some experiments gave better results than others, resulting in a selection of concepts that we would explore further.

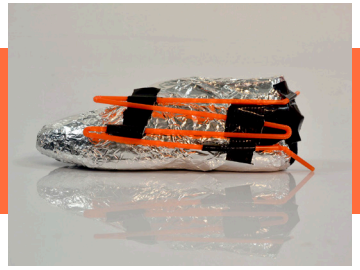


Balloons filled with paint - initial experiment

Sugar glass, applied to the sole. Very effective break, was cut due to a lack of time.

Candle wax, applied to the upper. Was explored further, applied to sole in the final iteration.

Straws on the upper, intended to contain liquid. Not very effective.



Shaving cream sole. Nice visual, future iteration needed bigger holes.

LAST

To create higher fidelity prototypes and to create coherency in our visuals, we wanted to give every prototype the same base structure. Therefore, we needed to get a shoe last to build upon, which we decided to 3d-print ourselves. Making the last ourselves provided a lot of learning opportunities. We learned to use Fusion 360 to convert our model of the shoe last into a file that could be 3d-printed. Our first 3d-printed shoe last was printed with 7,50% infill, but since this turned out to be too weak, our second one out of stiffer material and 10% infill.

UPPERS

Now that we had the shoe last, we could construct the base structure of the shoe. After doing the Midjourney workshop with Pei-Ying Lin where we created AI generated images based on prompts, we were inspired to create a bone-like structure, forming a carcass underneath our decaying elements. Furthermore, we had a meeting with Loe Feijs about how we could construct strong shapes. He taught us about what Voronoi patterns and diagrams are and how we could implement that in the design of our base structure. So with these two inspirations in mind, we started ideating, sketching and prototyping.

AI generated images - prompt: sneakers based on biomimicking

At the beginning of the semester, after our initial interest in shoe design, we first attempted to create a shoe. This attempt was not very successful and led to the conclusion that we would need a last. Nevertheless, this can be considered our first upper prototype.

Our first iteration of the skelletal base was made with cling film and a cheap glue gun to create the structure. However, this structure was not strong enough and Loe Feijs told us that we would need smaller shapes in order to make the construction stronger.

The next iteration was made with much smaller shapes and stiffer glue on top of a layer of duct tape. The duct tape formed the protection layer for the last, since the cling film on the last iteration was melting too much.

Although this prototype was better than the first iteration, the heel was missing a diagonal, making it unstable. The structure was not a correct Voronoi pattern. We created a final iteration with a better supported heel and a cleaner finish. Using acrylic paint added a nice looking texture after drying, giving the shoe its bone-like aesthetic.

Close-up final iteration

FINAL PHOTOSHOOT

For our photoshoot, we used a plain white background and our white carcass for every exploration, creating coherency in our visuals. And because the explorations themself have bright colors, they will stand out even more and attract the attention of the viewer. We went to the photoshoot studio in the Atlas building and learned how to use all the equipment in the room. We had to think of the lighting setup and how to avoid reflections. We kept our camera point consistent and took shots of everything we had.

Photo studio Atlas

BUSINESS & SOCIAL MEDIA

This project was difficult to place into a business model. To help us with this, we organized an expert meeting with advertizing production executive Joseph Togneri. We talked about how to use a business model canvas and Togneri taught us about creative agencies, how to calculate our costs, and how to set up a rough financial plan.

In order to reach a broader audience, we created an Instagram account. For this, we took inspiration from other designers using social media, like Netha Goldberg (@nethagoldberg), creating a coherent page.

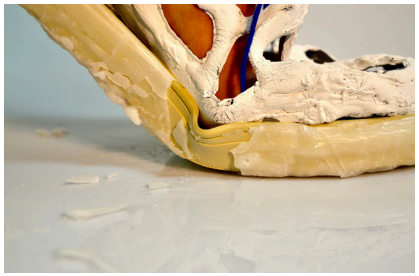
RESULTS

BALLOONS

For this iteration, the sole consists of water balloons filled with paint. This is the form of decay with the biggest effect area. This combined with the bright color of the paint, creates a dramatic splashing effect.

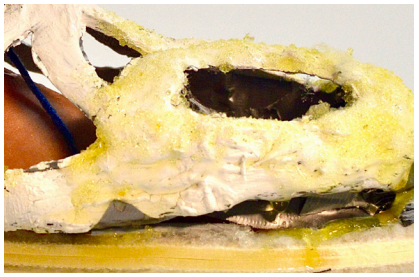
CANDLE WAX

This shoe contains a sole dipped into candle wax. The layer of wax breaks when you take the first step. This iteration is the most realistic adaptation of everyday shoes, showing its breaking point clearly.



COTTON CANDY

For this iteration, we focussed on the upper of the shoe, representing poor water resistance. We constructed it out of cotton candy, a material that dissolves very easily after it comes in contact with water. The cotton candy is melted off, revealing the ‘skeleton’ of the shoe.



SHAVING CREAM

The final iteration has a sole that consists of paper tubes. The inside of the sole is filled with shaving cream, which comes pouring out of the tubes once you take the first step. We used bright colored paper for the tubes to make the sole and the shaving

Explosive, colorful, splash

Breaking point, snap, fragile

Dissolve, reveal, change

Pressure, satisfying, trace

Apart from the visuals of our collection, we created a website and an Instagram account. Through these platforms, we aim to reach a broader audience and make people more aware of the issue at hand.

Lastly, we designed flyers, a poster and business cards to communicate our statement and our project. With these items, we were able to gain contacts on Demo day.

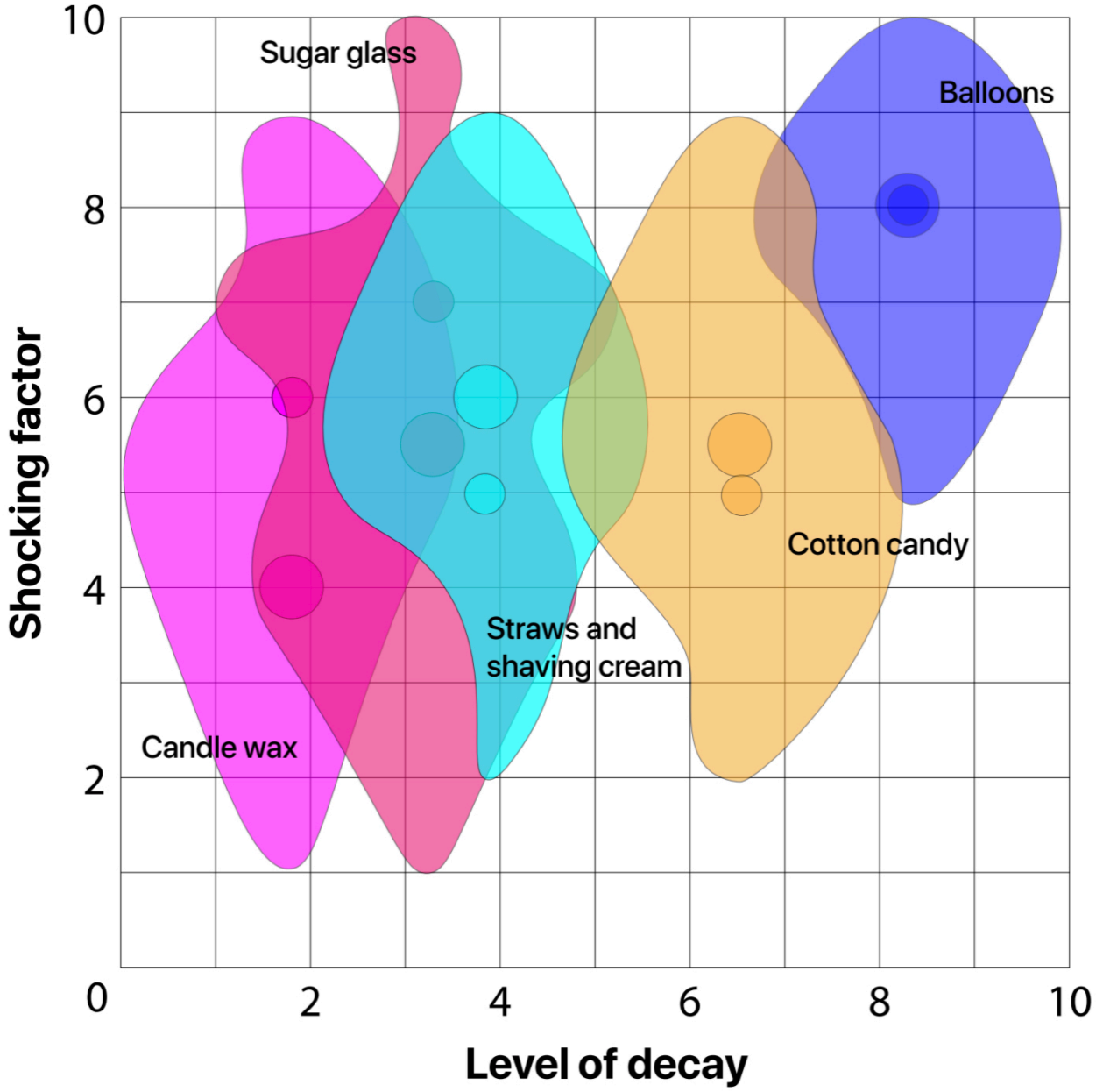
We presented our project with the perspective of our business plan. Our teams functions as a creative agency, consisting of an accountant, a creator and a producer. Together, we form a creative agency called IMPACT. IMPACT specializes in reaching people through provocative design. We offer our skills and knowledge on how to create visuals regarding provocative design to companies that can hire us for their specific project. Possible clients could be clothing brands like Nike or Fashion For Good, but also more politically related organizations such as Greenpeace, the UN or Cop28.

USER RESEARCH

To find out whether the images created are actually provocative and impactful enough to convey our statement, we decided to perform user research. This research should show which images have the most impact on our target group. Participants received a questionnaire containing our footage. We asked to assign a shocking factor to all iterations, providing us with quantitative data, and elaborate on their choice. The overall target population of the project is very broad, so we made the questionnaire suitable for a wide range of people.

To properly process all the data produced, the decision was made to incorporate it into a plot. A Material Property Chart, sometimes called 'Ashby' or 'bubble' chart, was chosen as the format for this plot. This is because this type of chart is useful to rapidly screen out large numbers of materials and to identify those materials that meet the property constraint. (Mouritz, 2012). This chart type could well be used to plot the shocking factor of the footage against the level of decay of the shoes.

Overall, a positive relationship between shocking factor and level of decay is reflected in the chart. This user test showed that the images of the shoe with balloons as soles and those of the shoe with cotton candy as an upper best fulfill the purpose of shocking. Later on during demo day, these results were confirmed when visitors were asked the same questions.



CONCLUSION

With this project, we have attempted to create a statement through impactful visuals. With the resulting collection of shoes, we were able to represent various forms of decay, appealing to a broad audience. Every shoe showed different qualities of destruction with different "shocking levels" that our audience could relate to, showing the benefit of creating a collection as opposed to a single shoe. Combined with a short and quick pitch on our message and a clean branding style, our project grasped attention, which was an essential part of designing a statement.

The additional purpose of our project is to go beyond simply stating an issue. We aim to start the conversation on this issue and get people thinking. How long do average shoes last? What meaning do we give to our shoes, and will our concept change this? What if you would wear your own shoes only once? We want to make people reconsider the value of their shoes, and show the bizzarity of buying shoes that you can only wear for a short time, maybe even just once.

DISCUSSION

In order to captivate our audience, we worked on a Demo day stand that would pop out from the rest. We aimed for videos with a high shocking factor, and judging from the various reactions on Demo day, that goal has been accomplished. However, the images mainly drew attention to our project instead of directly conveying our message. For that, we used the pitch, but things like adding facts next to the shoes or condensing our statement to a simple slogan would improve this.

Most of our issues during this project relate back to group organization. Falling behind schedule became a pressing issue for us, especially when we lost our fourth teammate with a few weeks to spare before demo day. Proper planning and stricter deadlines would be vital components to keep our team on track. Since we were short on time and had lost a team member, some elements of our project received less attention than they should have. For example, our footage was shot with a camera unsuited for slow-motion. An iPhone camera would get the job done in a higher resolution, but that would mean remaking the shoes and reshooting the videos, which time did not allow us to do.

We experienced most of our aforementioned time loss due to our mid-semester concept switch. At the beginning of the course, we went in different individual directions with our ideas and research for too long. The moment we decided to come together and combine our ideas, we only had a week until the midterm demo day. And our design reflected this. The project lacked coherency. Our solution was to create a new project that we were all on board with, but this could also have been resolved through proper communication and more initiative. After both of these issues, we learned the importance of planning and communication.

For our business model, we present ourselves as a creative agency. In an interview with design researcher Troy Nachtigall, he stated that we had created a "recruitment piece", putting our agency on the board and gaining interest. To understand our business perspective better, we could have reached out to i.e. non-profit organizations and environmentalists, gaining more perspectives on our project

FUTURE

After the presentation of our project on Demo day, we were left with one primary question: We have the attention, what comes next? In terms of the project, the future steps would be toinprove the quality of our shoes and videos, create more iterations, and spread our message even further; think expositions, talks, advertisements, and social media platforms. Another direction that we could go into is to put our shoes on the market and let people actually wear them. This would create walking promotion for our message, as well as engage people, especially when we brand our shoes towards activists. If we want to bring our shoes even more into the spotlight, celebrities or runway shows could be well-suited, creating a more significant impact through their influencer status and paparazzi. Additionally, our statement could seep into shoe stores as well if they were to turn into a fashion trend, making them more prominent in the industry.

As can be seen in our videos, our decayed shoes leave a lot of material behind. To emphasize this, we could re-design our shoes to decay over a slightly longer period of time and leave traces of the material, forming a direct representation of the pollution created by fast-fashion shoes.

Our shoes represent the short lifespan of fast fashion shoes, reduced to a single step. After that, our current shoes are no longer functional. However, we could redesign them to be regenerative in a way. In the case of the shaving cream shoe, you might have to fill the shoe back up with shaving cream every time you use them. Both of these ideas could contribute to the meaning behind the shoes.

For this project, we have interviewed shoe expert Troy Nachtigall and innovation specialist at shoe company Bata Christiaan Versteegh. We asked them "what would you want to see destroyed?" and both suggested something that hurts the foot wearing the shoes. Coals, nails, fire; these extreme forms of decay could have an even higher shocking factor, showing the damage a worn-down shoe can cause to your feet.

Troy Nachtigall also suggested looking into micro-encapsulation beads; tiny bubbles containing liquids or solid substances, integrated within fabrics. These could contain paint or even acidic fluids, decaying over a longer time as they slowly release their substances. Combining our current collection with existing technologies could unlock more potential.

To get a well-rounded project, we could take our project into different research areas. Like the ID masters looking at showroom, studio, lab, and field application, taking other approaches could provide new insights into our project. Currently, our project is mostly a showroom piece, but looking at different areas or application fields can shed a different light on our shoes.

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APPENDIX A

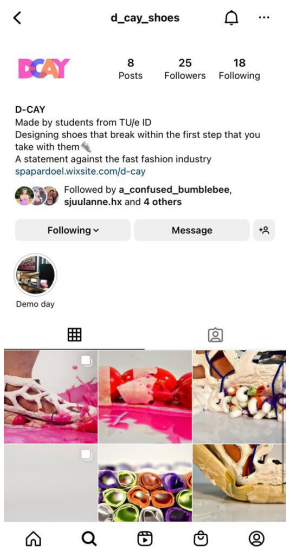
Links

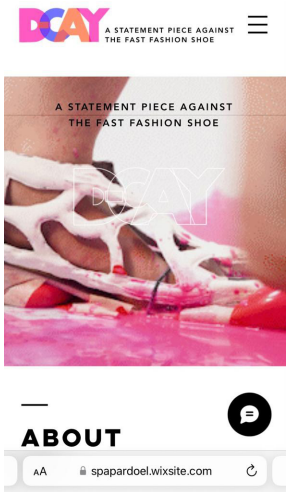
- Instagram: @d_cay_shoes

https://www.instagram.com/d_cay_shoes/

- Website: https://spapardoel.wixsite.com/d-cay

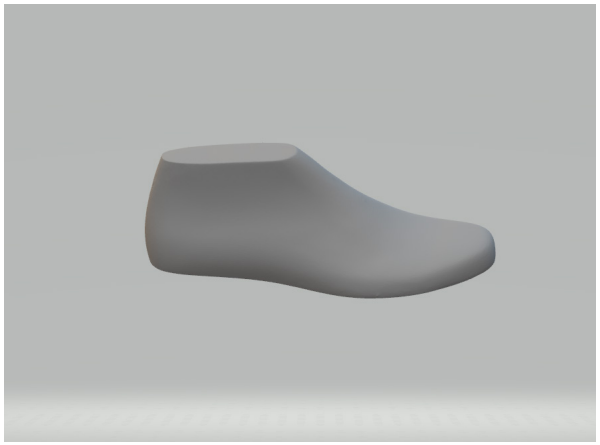
- Videos: https://youtu.be/7Bzc9Em6SBs

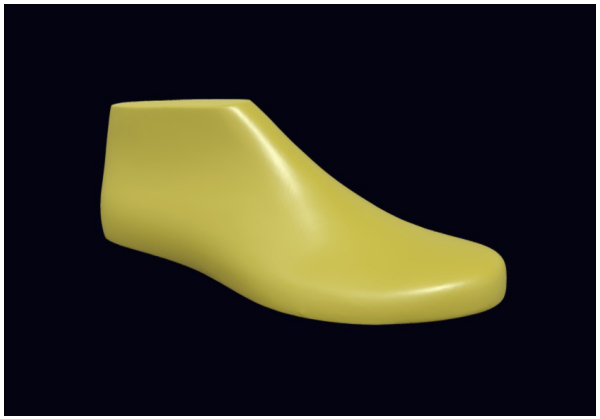




APPENDIX B

Shoe last - addtional material

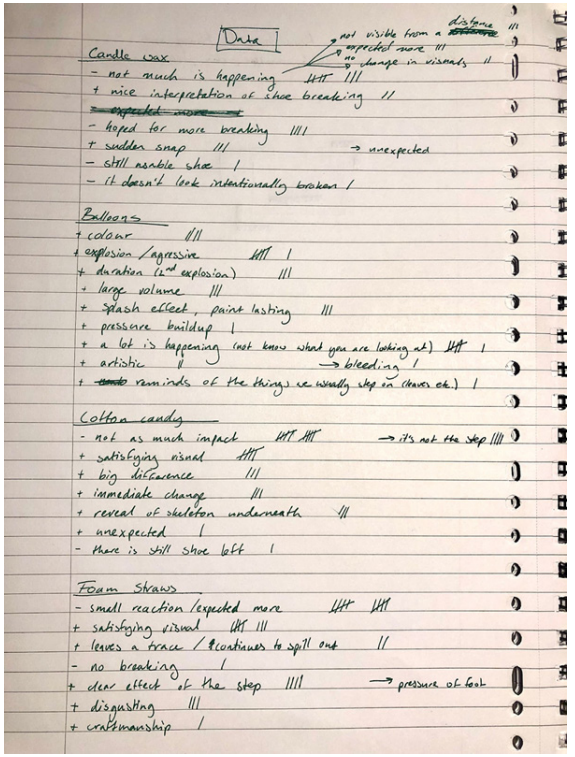


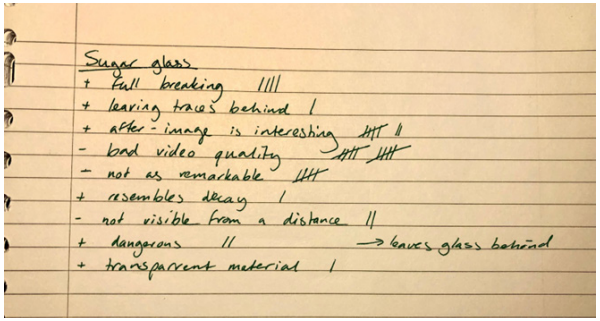


3D models last

APPENDIX C

User research data





	A	B	C	D	E	F	G	H	I	J	K
1	**User research data**										
2											
3	Candle wax				Cotton candy				Sugar glass		
4	Average	5.125			Average	5.625			Average	5.542	
5	Median	4			Median	5.5			Median	5.5	
6	Mode	-			Mode	5			Mode	7	
7											
8	Would you wear this shoe?				Would you wear this shoe?				Would you wear this shoe?		
9	Yes	25%			Yes	16.7%			Yes	50%	
10	No	75%			No	83.3%			No	50%	
11											
12											
13	Balloons				Foam straws						
14	Average	7.667			Average	6.042					
15	Median	8			Median	6					
16	Mode	8			Mode	5					
17											
18	Would you wear this shoe?				Would you wear this shoe?						
19	Yes	37.5%			Yes	45.8%					
20	No	62.5%			No	54.2%					
21											
22											
23											

APPENDIX D

Work division

The initial weeks are not included, as everyone was working individually and did an equal part.

Report

Tom: process, results, project goal

Sander: user research, abstract, introduction

Sjuul: conclusion, discussion, process, future work, lay-out

Upper

Tom: bone structure

Sander: last, 3D modelling

Decaying elements

Sander: candle wax

Sjuul: straws, cotton candy, water balloons

Marketing

Tom: poster, video editing

Sander: website

Sjuul: business cards, flyers, Instagram account

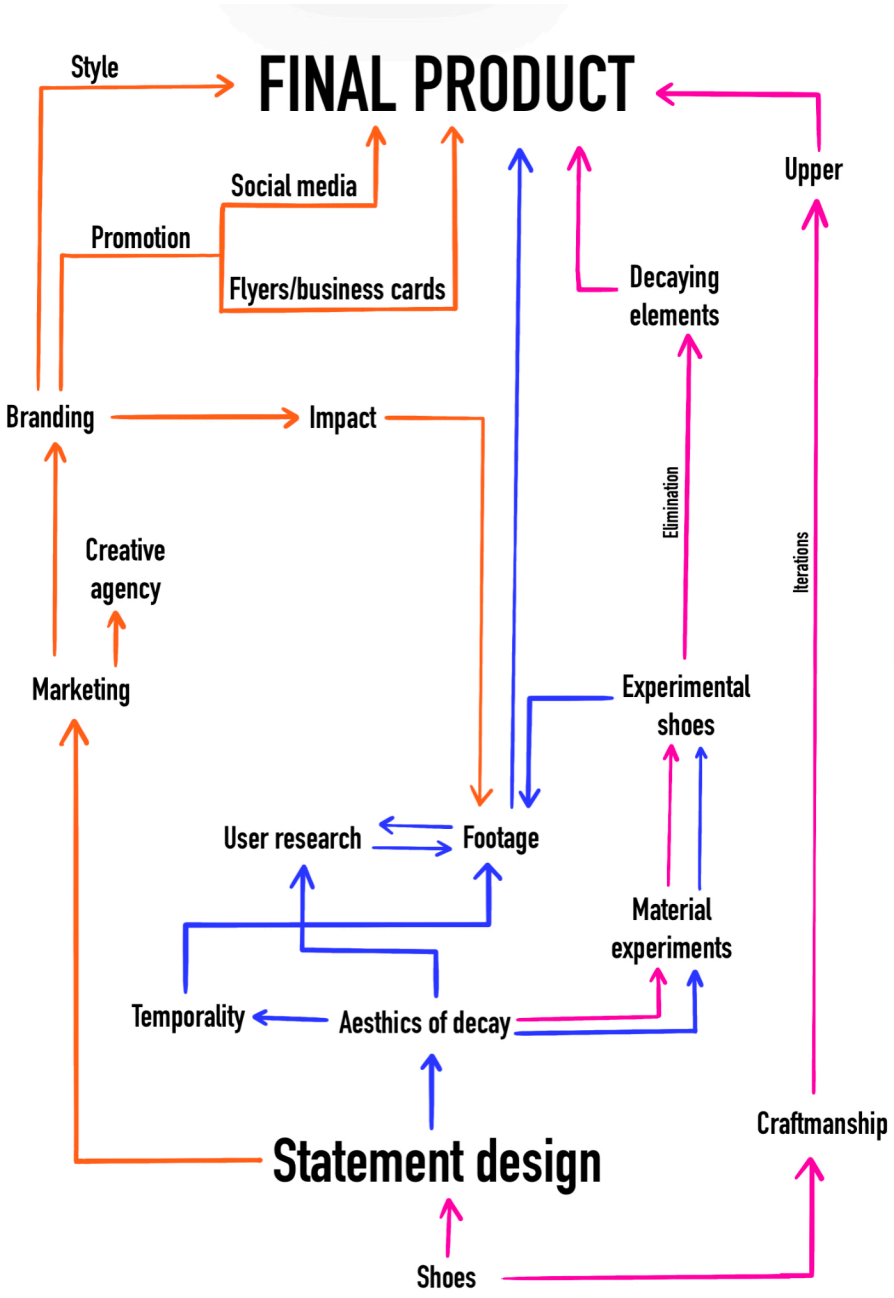
User research

Sander: data mapping

Sjuul: questionnaire, initial data processing, out-reach to experts, interviews

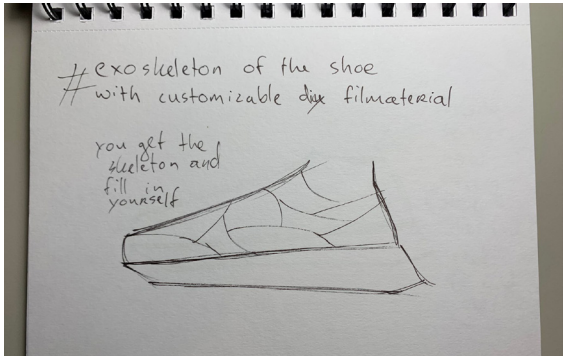
APPENDIX E

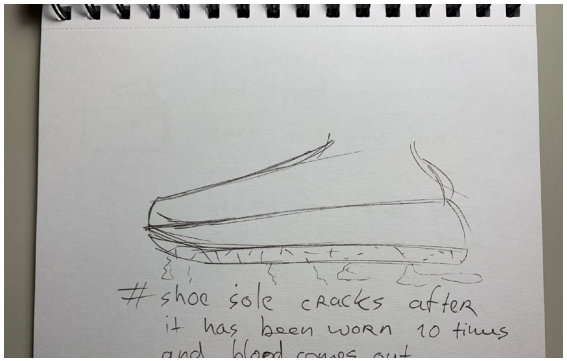
Flow chart - second quartile



APPENDIX F

Images and sketches that did not make it into the actual report

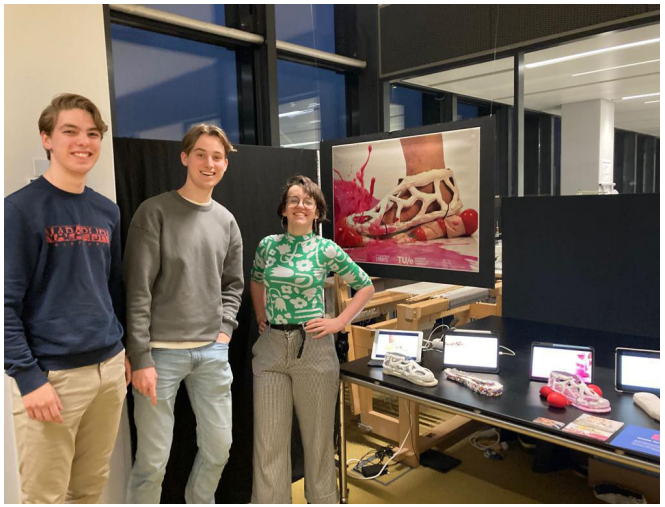




Sketches initial experiments

Prototype brainstorm before midterm demo

Filming balloon experiment



Our group on Demo day