Circular apparel recycling: The industry's current state and designing for circularity

Purpose

This study consisted of interviews with companies in the United States that participate in post-consumer apparel **recycling** with a resulting component that can be used in a new textile product.

Interview objectives included:

- → Developing an understanding of flows of post-consumer apparel.
- Determine what kind of apparel waste is currently being processed by these companies.
- → Identify technology currently being used for both sorting and recycling of apparel.
- → Identify challenges in the recycling process including those that can be addressed at the apparel design and development stages.

Background

- → The production of new apparel and disposal at end of life can have negative effects on the environment (Gam, et al., 2010).
- \rightarrow Designers' decisions affect up to 70% of a garments ability to be recycled.
- → In 2018 the EPA estimated the US generated 17 million tons of textile waste (EPA, 2018).
- Underutilized textiles represent billions of dollars of lost **opportunities** for reclamation (Ellen McArthur Foundation, 2017).

Methods

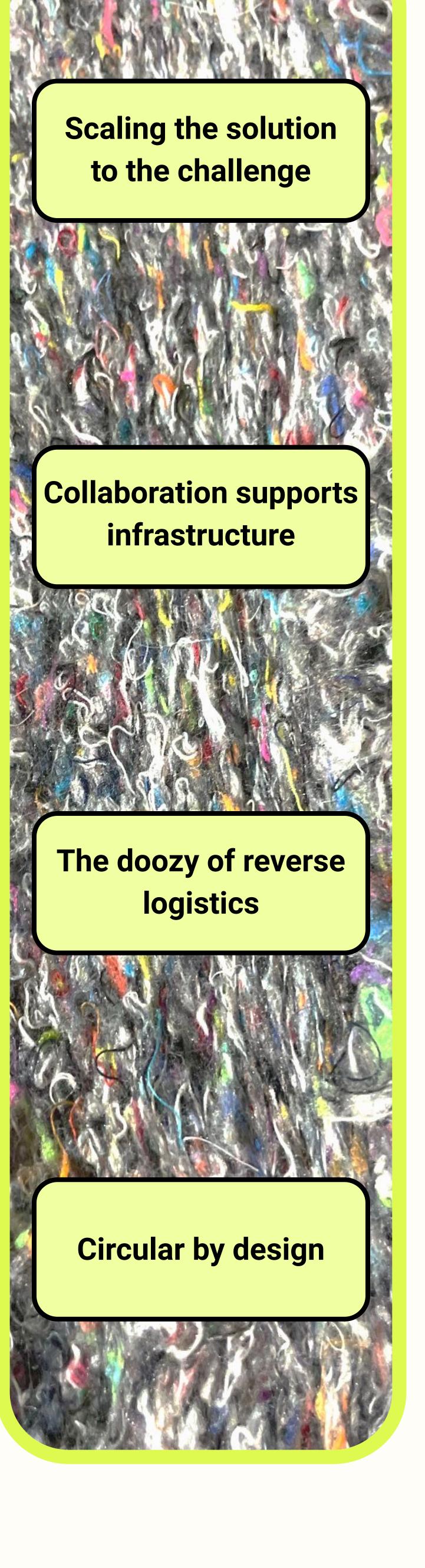
- → Participant interviews were recorded either in person or with an audio via a virtual video call.
- ➡ The interviews lasted 35-40 minutes and were collected between April and August of 2023.
- → A thematic analysis was conducted to code content and align themes with four defined research objectives.

Participants

Company	Type of Recycling	Location
Ambercycle	Chemical	Los Angeles, Cal
		USA
Circ	Chemical	Danville, Virgina,
Looptworks	Chemical/Mechanical	Portland, Oregon
Material Return	Mechanical	Morgantown, No
		Carolina, USA

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Themes



By Madeleine Lyon

Perspectives

Scaling operations is a primary target → Vertical integration is critical Scaling their operations quickly was

closely related to capital investment & speed to market

→ **Revitalization** of communities within the US factored into facility location

Collaboration is essential for waste collection and aggregation.

→ All participants noted **it was crucial** for the **survival** their business.

➡ Government intervention is necessary to provide solutions for consumers and industry.

Recyclers hope that policymakers will intervene to help connect the

consumer to industry.

Automation for sorting materials could increase the amount of material that could be processed. Technological solutions cannot be fragmented by material, there needs to be a blending of innovative technology.

→ Quality control of post-consumer material is a major paint point.

Designing new apparel for circularity is essential for the future.

- Educating designers on the intrinsic properties of materials could lead to more intentional design.
- → Material selection is somewhere
 - designers have potential to make an
 - **impact** on end-of-life waste
 - management of a garment.

"So, the core goal that we have right now is how do we get this technology scaled to commercial volumes to make a dent in the huge volumes that are currently affecting us – are affecting our landfills and our environment." - Recycler 1

"There's a lot of government policy we need – Well, I'm not talking about like, an entire city saying, you can't throw textile waste in the landfill because that doesn't fix the issue."- Recycler 3

Discussion

challenges centered around scaling, further need for collaboration and building of community, material blends, and

References

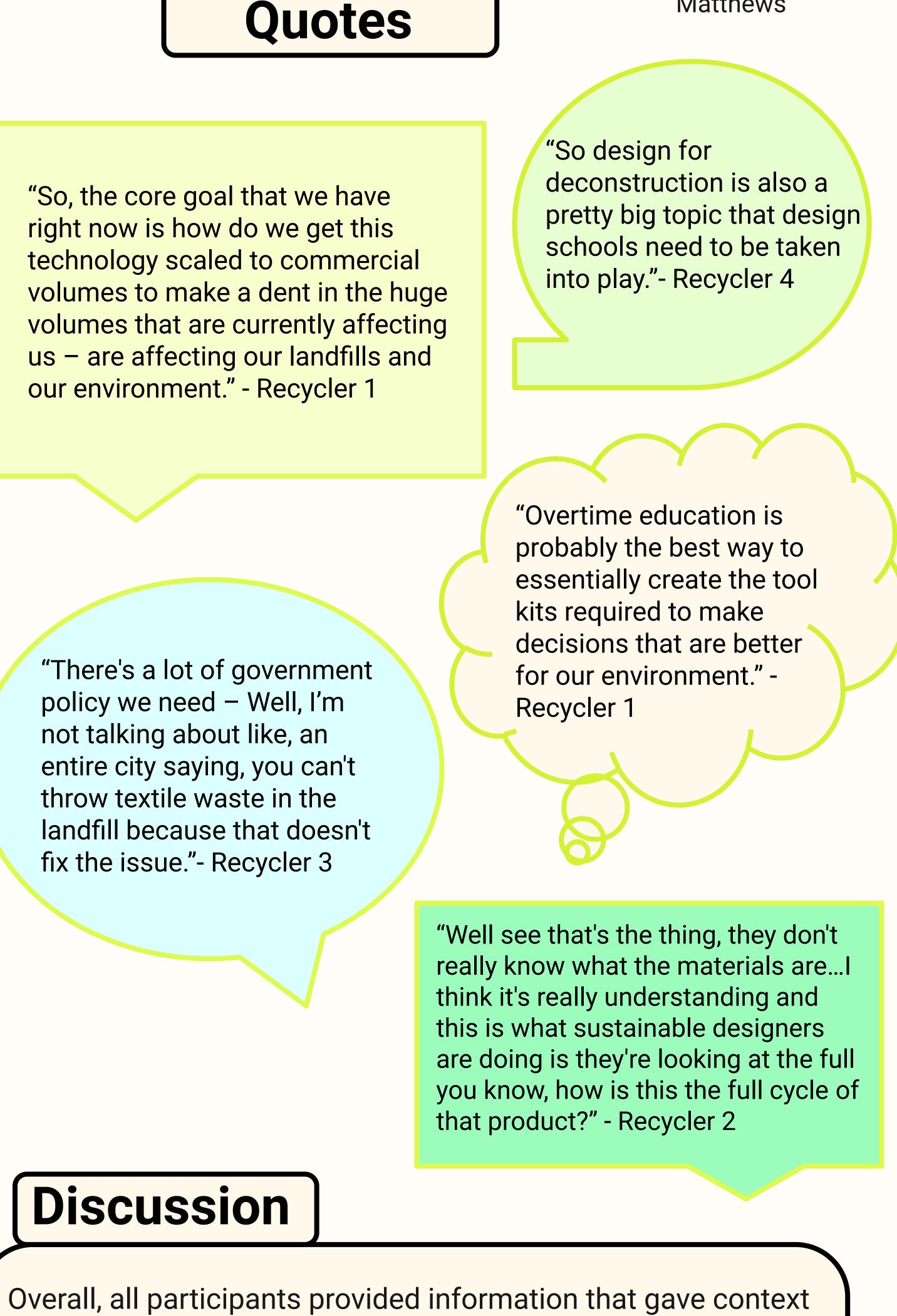
Ellen MacArthur Foundation. (2017, December 01). A New Textile Economy: Redesigning Fashion's Future. Retrieved February 04, 2022, from https://emf.thirdlight.com/link/2axvc7eob8zx-za4ule/@/preview/1?o Ellen McArthur Foundation Report ➡ EPA. (2018). Environmental Protection Agency: Textiles: Material-Specific Data. Retrieved December 3, 2022,



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- to the lacking circular recycling infrastructure for
- post-consumer apparel within the US. Some of their largest
- a lack of awareness from product developers and designers.

Gam, H. J., & amp; Banning, J. (2011). Addressing sustainable apparel design challenges with problem-based learning. Clothing and Textiles Research Journal, 29(3), 202-215. doi:10.1177/0887302x11414874