Eliminating textile waste requires new ways of thinking

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Credit: University of Borås

A lot of material is wasted when clothes are produced; reducing this waste requires new ways of thinking. "The system was built up during a

time when we thought that the earth's resources were unlimited, which we now know is not true. My model and experimental three-dimensional designs aim to get designers and the industry to move away from the current system," said Holly McQuillan, who recently defended her doctoral thesis in textile design at the Swedish School of Textiles.

Newly-minted doctor Holly McQuillan has always had a burning interest in the environment and wanted to help improve it. The textile industry is not environmentally-friendly in its current form. McQuillan's doctoral thesis, Zero Waste System Thinking: Multimorphic Textile-Forms, aims to explore new methods of eliminating textile waste in the part of clothing production that takes place before the garments even reach the consumer: the waste material that ends up on the floor during cutting and sewing. Cutting and sewing is still the most common way of making clothes, and during that process, a lot of waste is generated.

More than a design method

The doctoral thesis focuses on the environmental crisis and the concept of making zero waste. Initially, Holly McQuillan saw zero waste only as a design method, but during field studies and interviews at various companies, it soon became clear that zero waste is in fact a way of thinking, and that existing conventional systems limit how industry and society think about the waste problem. Therefore, the next step in the doctoral thesis research was to explore the concept of zero waste through experimental research as a system, primarily focused on different visions of the future.

"Design requires several perspectives at the same time: the composition of the material, origin, design, target audience, the context in which it is manufactured, the waste it creates, the industry and the surrounding society and—most importantly—the earth," said Holly McQuillan.

In the results of her doctoral thesis, she presents a number of thought models, or "Zero Waste System Thinking" models, also called ZWST. They serve as tools to be able to look at industry in a holistic way and combine theory with industry practice—with the goal of creating a broader understanding of the environment and the social context we all find ourselves in.

"All human activity needs to be nested within the bigger system we all function within—the earth. The system we have now was built over a time where we thought earth's resources and capacity were unlimited—we now know that to be untrue. This model aims to support the industry and designers to move beyond responding to the systems we currently have," said Holly McQuillan.

Weaving of whole garments

She also used the ZWST model to develop design methods forweaving entire garments. She has further selected three groups of textile forms: flat, knitted, and three-dimensional—all with enormous potential to reduce textile waste. Conventional weaving, where the traditional "sewing and cutting" method dominates, is today two-dimensional and thus not as effective. At present, designers lack knowledge about the connection between woven textiles and shape, which limits their ability to contribute to change. As a solution, Holly McQuillan highlights three-dimensional shapes created through casting, sculpting, and printing. Through three-dimensional weaving with a textile shape that dives deep into the textile system and embeds the shape into the textile structure itself, the door to a more sustainable and holistic design is opened.

"I call this way of thinking 'multimorphic,'" said Holly McQuillan, and points out that the new technology turns the conventional industry's supply chain upside down.

An example of Holly McQuillan's designs. Holly McQuillan highlights three-

dimensional shapes created through casting, sculpting, and printing. Through three-dimensional weaving with a textile shape that dives deep into the textile system and embeds the shape into the textile structure itself, the door to a more sustainable and holistic design is opened. Photo: Amanda Johansson

There is no economic benefit for the business community to strive for zero waste in the current business model, but with new legislation, this can be changed. Holly McQuillan's hope is that companies, independent designers, researchers, and students will now be able to use the ZWST models to map their current ways of working and thereby see where there is a need for change or where new systems can be created. For example, weavers can use the design methods for textile forms that have been developed in order to become clothing manufacturers, and brands can develop innovative design and production by weaving entire garments.

"We can get textile industries to move towards the sustainable future we need," said Holly McQuillan, who imagines local manufacturing that takes place to order and does not create any waste from production.

Her vision is a future where regenerative microsystems in the textile industry are combined with hyperlocal design and regenerative production that are linked together digitally.

It is also hoped that other fields, in addition to textiles and fashion, will use the models to think differently about their own industry—and thus contribute to a more sustainable future.

Holly McQuillan, who comes from New Zealand, is happy to have now defended her doctoral thesis and looks back on four rewarding years at the Swedish School of Textiles.

"It has been so great! The studio environment at Borås is amazing, my colleagues are wonderful and challenging and supportive, and the facilities are some of the best in the world."

Holly McQuillan wants to continue with her research and build on the collaborations she has started.

"I would love to work with researchers in fashion and textile management, business management, fiber development, textile technology, and agriculture, and more, to expand my research further. I also love teaching, especially helping students understand the complexities of the fashion and textile industry in regards to sustainability."

She would like to stay at the University of Borås; she is looking for new, interesting challenges and has, among other things, applied for funding to be able to continue the work she started as part of her doctorate.

"It's an exciting field, and there's growing interest in transforming the fashion and textile industries. I hope to be a part of that transformation!" said Holly McQuillan expectantly.

More information: Zero Waste Systems Thinking: Multimorphic Textile-Forms.
hb.diva-portal.org/smash/record.jsf?pid=diva2%3A1478307&dswid=6149

Provided by University of Borås