Chair a Story – What Repurpose-Driven Design can contribute to upcycling more dining room chairs

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Abstract: ReTuna Återbruksgalleria is a mall in Eskilstuna, Sweden, entirely dedicated to second-hand products. Goods are being donated continuously. Daily, the different entrepreneurs in the mall get to select products from the new donations. They then sell them as-is, or repair, refurbish, or repurpose the products. Products that are not selected by the entrepreneurs for a week are redirected to material recycling and/or energy recovery.

Both by numbers and by volume, dining room chairs constitute a substantial part of the flow through ReTuna. Many of these chairs are technically fine, but aesthetically out of fashion or slightly worn. The number of donated chairs is much higher than what the entrepreneurs in the mall can take care of and sell. Hence, a substantial percentage of functioning chairs goes to low-level end-of-life treatment.

In repurposing or upcycling, the previous life of products and materials is treated as a value. Reclaimed materials have a story to share (ibid). In the current project, we explore how designerly explorations of the dining room chairs might help to re-direct them to higher-value applications. We use a repurpose-driven design approach, which is an adaptation of material driven design.

The design research approach consists predominantly of two explorations: Returslöjd (ReCraft) which is a workshop (three sessions of three hours each) where 8 skilled participants used craft techniques and reused materials to upcycle worn chairs. The other approach is based on material from disassembled chairs and products made by repurposing the material. Results were shown during an interactive pop-up exhibition at the ReTuna mall. The aim was to solicit opinions and emotional responses of the shoppers at ReTuna mall for two weeks. These insights of both approaches are then translated into findings and potential designs.

Introduction

The latest Circularity Gap Report indicates that the world economy is only 8.6% circular (Circle Economy, 2022). To increase circularity, we will need the full range of strategies: re-use, re-distribute, refurbish, repair, repurpose, and recycle. Repurpose, certainly at large scales, is the one strategy in this row that is least explored academically (Lepelaar, et al 2022).

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Our study was executed at ReTuna Återbruksgalleria, which is a second-hand mall in Eskilstuna, connected to a recycling station. ReTuna started in 2015 and has been growing since. The mall houses an array of shops/entrepreneurs (currently 14) that base their business on donated products. At ReTuna, people can donate products they do not need or want anymore and give them a new life. The first stop for all donated products is a place called ‘Returen’ (Returns). The staff at Returen sort the products and make a first selection of the products that are in good condition to reuse. The entrepreneurs/shops in
the mall then get to choose form those products, to reuse and/or upcycle them in their businesses. Objects that are not selected by the entrepreneurs are diverted on Thursdays to material recycling and energy recovery.

ReTuna is the world’s first upcycling mall and is seen as an inspiration and a leading example both internationally and nationally (About us - Retuna, 2021, https://www.retuna.se/om-oss/).

The ReTuna eco-system
Observations help designers to understand a specific situation and how the people involved are working (van Boeijen et al., 2020; Wiberg-Nilsson et al., 2021). This method was used in the first step of the research phase, to understand the reality at ReTuna. Observations were supplemented with semi-structured interviews with different actors in the ReTuna ecosystem, including multiple entrepreneurs who have their business in the mall.

The observations were done by working together with the employees during five days, but in a role of observing and counting furniture and understanding the flow of products. Notes and information collected during the five days was written down on the back of the template and transcribed to a digital document by the end of each day. In the end of the week, all the notes from the observation were printed out, and analysed together with the filled in templates. All the entrepreneurs who have an enterprise in the mall are welcome to pick furniture in Returen everyday between 09.30am and 10.00am.

An important tool in Returen is plocklistor (the Wish Lists), which is used to help the workers in Returen to understand what type of products the different businesses want to have and what is included in their businesses. The Wish List helps the entrepreneurs and the people working in Returen to sort the products and get them to the right place.

In a previous study at ReTuna Återbruks-galleria, Madeleine Svensson (2021), found that 49 percent of the furniture that comes into Returen at ReTuna for upcycling and reuse actually goes on to the Recycling centre and thus to material recycling and energy recovery.

Case Selections: Chairs
Based on the result from the observation, interviews with actors, discussions, and reflections, dining room chairs were selected as the focal product. This is based on the following insights:

- Chairs are the type of furniture that comes in and gets thrown away at the highest volumes.
- It is difficult to store chairs for a longer time and to sell chairs when there are uneven numbers, which is commonly the case.
- Chairs contain materials that can be transformed into something else, namely wood, leather, metal parts, screws, etc.
- The inflow of chairs is bigger than the number of chairs being sold, and therefore a lot of the material in the product goes to incineration or material recycling.
- Since chairs often consist of more than one material, the whole chair often goes to incineration instead of material recycling.

![Figure 1. Typical selection of dining room chairs at Returen. Category 1, 2 and 3. (Berglund, 2022).](image-url)
Our objective thus became: Find a way of how chairs can be upcycled or repurposed to increase the number of products staying at ReTuna mall instead of going to the recycling station.

One of the most important things while working with reuse of products is the sorting and categorisation of the products. Based on our pre-study we distinguish three categories.

**Category 1:** Old chairs with good quality, but some parts are worn out. One of the chosen products for our study in this category is produced by the company TON Chairs. A set of six similar chairs were coming in to Returen and were going to be thrown away. The Company TON aims to produce hand crafted chairs with good quality. The selling price for these chairs is between USD 100 and 300.

**Category 2:** Chairs that were trendy and modern a few years ago, that now are coming in in high volume and are still in good shape, but no one wants to buy them. Again one is selected for our study. This chair is composed of more than one material, wood and fabric, which result in the incineration waste container.

**Category 3:** Broken chairs are included in this category. This includes incomplete chairs (Fig 1), as well as chairs with for instance cracked seats. Even if the chairs are broken, they consist of materials that can be used in new products. There are a lot of different models of chairs in this category. (see Figure 1)

**METHODOLOGY AND INTERMEDIATE RESULTS**

To explore how the chairs in the different categories can be repurposed and upcycled two different approaches are proposed.

For the chairs in category 1 an approach based on craft workshop was used to explore how chairs can be upcycled in different ways and therefore increase the value.

**Approach 1: Workshop - upcycling and crafts**

The workshop was based on three sessions; each three hours long and held during three evenings in March. Eight participants from a craft course at ReTuna called Returslöjd (=ReCraft) participated in the workshop. The starting point for the first session was to use six identical chairs, and some other chairs from category 1 were also used.

The purpose of this workshop was to understand and document how worn-out chairs with good quality can be upcycled and get new value in different ways. By letting eight people with a lot of knowledge and experience about different craft techniques work with the chairs. The purpose was to gather knowledge together in the group, to learn from each other and to increase the value of the chairs. An observation of how the participants was working and how long time the different steps took was documented.

**Results:**

**Workshop Returslöjd**

Eight different chairs were upcycled during the workshops at ReTuna, during three Thursday evenings. Five of these chairs was the TON chair model and one was kept in its current condition to demonstrate the transition. (see Figure 2)

Embroideries from the storages in Returen became an inspiration for the upcycling of the chairs.

Only one of the five participants working with the TON chair model decided to repaint the wooden parts. This is a result of not having that much time. According to employees at IKEA second hand, that is the hardest part to create new value for chairs and sell it. It takes time to repaint chairs, which means that the price needs to be higher, but the customers are not willing to pay the true price that it would result in.

**Figure 2. The craft upcycling of category 1 chairs. (Berglund, 2022)**

**Approach 2: Material Driven Design (MDD)**

Material Driven Design (MDD) is about having the material as the main driver for the development of products and design concepts, starting from understanding the material. This
section is based in the method MDD. This method is usually used for new-coming materials that needs an area of use (van Boeijen et al., 2020). The aim is to use the MDD method in this project but adapt it to explore the potential of using already existing products as the main driver in the product development.

The four main steps in MDD were used in this approach together with the chairs from category 2 as material input. This section refers to the steps Material Driven Design (Karana et al., 2015). The aim with the process was to have MDD as a starting point and to document thoughts and challenges in each step, which afterward was summarized and analysed to an adapted method, Repurpose-Driven Design.

**Step 1 – Understanding the material, and product**
This step is about understanding the material you have. Understand the why. Take it apart, feel it. Figure 3 shows all the materials that one of the chairs in category 2 consist of.

The next part of this step is to sort the material in different material categories, it is preferable to collect more of each material, for example in this case using three chairs. The properties of the materials were analysed and for example oak, which some of the parts are made from, is rot-resistant and resistant to moisture.

**Step 2 – Create a vision, understand where you want to go**
In this step, the result from step 1 was further explored by brainstorming about what to do with the material. By organising a workshop with other people this could create more ideas. In this step brainstorming by sketching was done.

**Step 3 – Understand how you can get to your vision by using the material you have**
In this step a deeper understanding of the material is needed. What are the strongest parts of the collected material? To clarify this step, it was helpful to talk with different experts. In this step it was important to refresh and clean all the material parts, and after that start exploring by saw and break up the material. How the parts can be used in different products to maximize the value was analysed in this step.

**Step 4 – Creating material (or product) concepts**
The result from step 1-3 is turned to reality in this step. Create the concepts from the information gathered about the material and its properties. In this step it is important to think about new flows, can someone else use the material that cannot be used in this concept? Start building and testing, in this case the parts from the dining chairs were transformed into different products.

**Results of Material Driven Design**
By following the steps described and exploring the potential in the material that a chair from category consist of, different products were put together. The game in Figure 4 is one of the results from using the different steps.

![Figure 3. All the materials that one of the category 2 chairs consist of (Berglund, 2022).](image)

![Figure 4. the Kubb game made out of re-purposed dining room chairs. (Berglund, 2022).](image)

The process of transforming a worn-out dining chair to other products with support from the steps in MDD was instructive. The thoughts that came up during the process and each step was documented. This process led to the approach Repurpose Driven Design (RDD).
One of the most important findings from doing this process was that the previous product and its history helps to decide the design and appearance for the new product. This can be both a challenge and a helpful direction. In this case the Kubb-game was created in the way it is because of the markings in the wood parts from all the staples. The ‘King’ is made from the biggest parts found in the frame of the chair. The products were tested by playing the game and using the bag which created discussion and thoughts. The game got positive feedback, one of the test persons clarified that it was working perfect, it was fun that the parts looked a bit different, more fun to play than a newly produced game and that it was unique (Test person, personal communication, April 23, 2022).

Validation: Pop-up exhibition at Retuna
To validate and evaluate the two different approaches, collect data and share the survey, a Pop-Up event and exhibition was held. The exhibition was conducted at ReTuna Återbruksgalleria, on the second floor, in the corridor outside the stores during 3 weeks in April. The name of the exhibition, Chair a Story is based in storytelling and to rethink the value in chairs. (see figure 5)

To connect the parts in the exhibition a survey was made, to collect data and get a greater understanding of the user. It was tested and evaluated and reformulated before using it. In total there were 30 people who answered the survey and many of the visitors was just looking at the exhibition and talked about what they saw.

QR-codes were placed on different places to easily access the survey from mobile phones.

The main insights from analysing the survey and all the collected answers from people is presented in this section. In total 30 people answered the survey. A main drive for people to buy second hand and something that people think is important to know, is that climate impact of the product less compared to a new product. The main findings connected to storytelling are presented below:

Question: What information do you take with you after looking at the renovated chairs? Choose two options that feel most important for you to know.
• 27 out of 30 people choose the option: To know that the chairs have been saved from being thrown away.

DISCUSSION & CONCLUSION ON DESIGN RESEARCH PHASE
We have shown that it is possible to create more value by using craft and already produced materials. Using MDD resulted in some different products and concept. Even though it is a repurposed product, it is important to make sure that the products will last, by testing it and get feedback. Challenges with using the MDD for already produced material in products is that you need to be flexible and focus on the shape and properties of the product as your starting point. The way the MDD method was used in the concept phase of the project was not structured in a linear way all the time. The
process went back and forth between the steps to understand how they could be adapted towards repurpose driven design.

In this case, different tools and machines were used, saw machines, cross-cut saw, and drill. These are machines that usually exist in common workspaces. To do an interactive pop-up exhibition was a great way to get input in this type of project. It was a fun way of get to talk to different people and get feedback on the different products.

FINAL APPROACH FOR REPURPOSE AND UPCYCLE DRIVEN DESIGN
Based on the result from the exhibition Chair a Story, the different parts of Approach 1 and the process of Approach 2, a final approach was developed.

Preparation starts from the step 0 when the product is seen as waste and is on its way to the end of its life. But waste is just resources on the wrong place. Is it broken, at the wrong place, a coincidence, or an accident? (still step 0).

Evaluate your findings from the Preparation & Understanding and start to either upcycle or use the Repurpose Driven Design method.

When doing Step 0 the first question to ask is: Can the product be upcycled to increase its value? If the conclusion is Yes, the steps presented in Figure 6 can be followed. The steps work as short guidelines to help increase the value for the product. For example, when identifying category 1 of old quality dining chairs, a decision was made to upcycle them instead of disassembling and use RDD.

Based on the process of using the Material Driven Design method to create new products from already existing products, the steps 1-4 presented in this section have been developed. Here, the seminar about the report Repurpose Driven Design and Manufacturing, a research project done at Amsterdam University of Applied Sciences (Lepelaar, et al 2022) was part of the inspiration.

How can the concept that has thus been created in steps 1-4 stay in the loop? This question needs to be explored in the final step. Another part is to imagine and research how the concept can be scaled up, and what production techniques can be used. Regarding marketing: tell the truth about the production and materials, show how it’s done and what is reused and what is not, be open and share with others.

![Figure 6. repurpose-driven design. (Berglund, 2022).](image-url)
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References