Redesigning a Trash Bin

Public Summary Bachelor Assignment Industrial Design Engineering University of Twente

Darius Alamsjah Pane - S2121891

22 June 2022

Introduction

This bachelor assignment is about redesigning a 30L kitchen pedal bin for the company Dealtraders B.V. in Goor, and specifically for their brand Homra. Currently the brand Homra sells various trash bin models for a variety of customers. However, none of their trash bin models are of their own design and are in general trash bin models from their suppliers. Wanting to differentiate themselves from others with a product of their own design, and understanding that competitors like Brabantia, Songmics, Amazon Basics and SimpleHuman do well with their products on the market, this eventually leads to the research question:

What factors affect the successful design of an indoor trash bin, and how can these factors be implemented into the products of Homra?

With the main research question, the aim of this assignment is to understand the market success of the competitor pedal bins and come up with an improved trash bin design for that reflects what the company Homra stands for. The assignment focuses on the scopes of Human Interaction & Ergonomics as well as Design & Styling and takes place in both the Research and Conceptualization phases of design, acting as a forerunner to the production phase of the design.

Figure 1:

Competitor Pedal Bins from Songmics (1), Amazon Basics (2), SimpleHuman (3), and Brabantia (4)

Approach

To answer the research question, a reverse design approach was used, that split the research question in two parts, the first part focuses on identifying the factors that influence a successful trash bin design, while the second part focuses on implementing these factors into the designed trash bin model for Homra. To understand the factors and requirements that influenced the success of current competitors on the market, a user, type of waste, competitor, design as well as sustainability analysis was conducted. To also better understand the company the client and their current designs were also analysed. As this led to a long list of requirements, the MoSCoW method was used for prioritizing requirements, which gave insight to what should be focussed on for the iterative and conceptual processes and how to best answer the second half of the research question.

To answer the second part on the implementation the various features that make competitor models successful were iterated upon and eventually resulted in three main concepts. Comparing the concepts to the requirements a final concept was chosen and using feedback from both the company and the user the final concept was finalized. This final concept was eventually turned into an actual sized 3D CAD model, so that it can be evaluated on technical requirements like dimensions, production costs and be used as a blueprint for if the company desires to produce the model.

Results

Figure 2:

Figure 3:
The Final Design

From the literature research conducted in this assignment, it was found that the factors hygiene, ergonomy, technicality, design, cost, and identity play a key role in the development of a successful trash bin. Keeping these factors in mind the final design as seen in figure 3 was created. Although all factors are as equally important as the other, they influence the success of the trash bin design in a different way. The factor ergonomy for example influences the user experience, through its design implementation.

One of the implementations of this factor seen in the final design is through the implementation of cut outs as seen in figure 4 in the inner bin that allow users to reach the trash bag and replace it with a new one more easily. In terms of technicality users found the usage of space very important, meaning the final design had to be space optimal. Looking at table 1, the final design succeeds this by covering a significantly smaller surface area than its competitors while holding the same capacity. A consequence of its smaller surface area coverage however is that its height increases.

In general, though the design remains quite simple, and does not have any innovative features like a perfume holder, or a completely new pedal mechanism, aside from the usage of form fit connection system for the parts. Instead, the design makes use of well proven features from competitors and Homra and combines it into a final product, reflecting the assignments' goal of redesigning a trash bin.

Specifications	Requirement Maximum	Competitor Average	Homra Model
Dimensions (L x W x H in mm)	L/ DiaM: 400 W: 350 H: 750	L/ DiaM: 363.4 W: 289.5 H: 644.8	L: 324.0 W: 267.4 H: 711.0
Height with Lid Open (mm)	950	894	1035
Surface Area Coverage (L * W in mm^2)	< 130,000	105,527	69,080
Weight	< 8kg	4.14	14.62

Table 1:

Dimensions Table

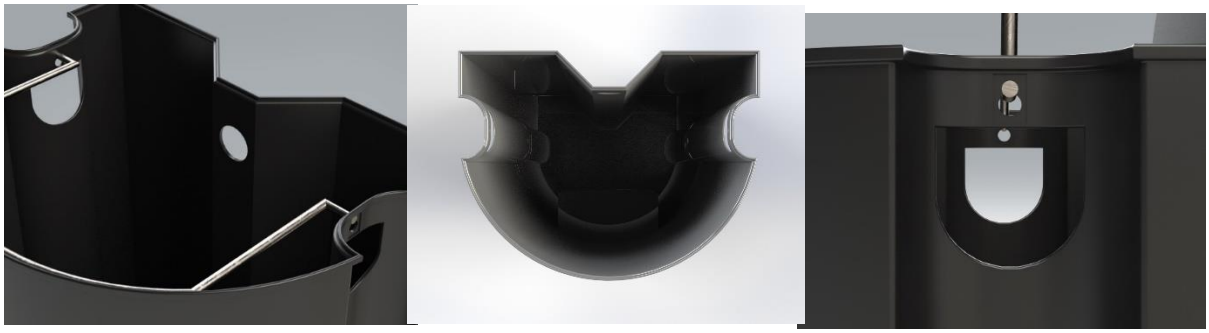

Figure 4:

Inner Bin Cut Outs

Conclusion

In conclusion, the research question has been answered to the extend that the factors of hygiene, ergonomy, technicality, design, cost, and identity have been identified, and that it reflects the companies' values by offering a product that stands out in design, retains its simple and durable functionality while also enhancing the user experience through ergonomy. In the end becoming a product that is becomes part of the users daily lives, a product designed for living.

Reflection and Recommendations

One of the main limitations is how it has answered the research question. While the factors to a successful trash bin design have been identified, and that its success has been backed up with literature research, interviews, and survey results, it is quite difficult to measure this success in the actual market without proper market testing. This can be done with prototype testing with a sample user group representing part of the market and drawing more accurate conclusions from there.

Other limitations in the process of the report include inclusion of designers and improving cost estimations. Design students or designers could have been included in the design process to give insight useful feedback for the iterative and conceptual process. The cost estimation was still very rough as it only includes the direct material costs of the model and could have been overcome by consulting expertise or suppliers in this field as well.

For the design itself only the Outer Bin required main improvements, with it costing 31 Euros, it is too expensive to produce with for the targeted user and production costs of 20 Euros for the entire bin. Costs can be reduced through using a cheaper material or decreasing thickness of the sheet metal used from 2.5 mm to 1 – 2 mm to decrease material usage.