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Graphic Instructions on Packages: A New Way to Improve the Consumer Repackaging Experience with Multi-Component Products

by

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ABSTRACT

Consumers have difficulties with the returning or changing process with a major reason: repackaging. This occurs mostly with multi-component products, since putting all the different parts back into the original package safe and sound could be challenging for a lot of people.

The traditional packages for multi-component products are usually made up of the inserts and the outer boxes with materials of corrugated board and recycled cardboard. Due to the limitation of materials and structures, few improvements or variations have been made with packaging boxes, which led to the unsolved issue of repackaging difficulties.

Having discovered such problems, the improvement of the repackaging experience for multi-component products became the topic of the thesis work. Research was done by studying people's basic habits dealing with repackaging and positioning multiple parts back into the supposed positions.

Two main directions have been taken towards this topic which are improving the outer boxes and making the packages themselves instructional.

Key words: repackaging, multi-component, positioning, instructions, package insert
INTRODUCTION

Through the years, packaging has been unchanged for the most part due to the material and structure restriction. Also the ignorance of human interaction with packages has led to the lack of pleasing experience.

Especially for the packaging boxes made out of corrugated board. They serve as the function to accommodate and protect the products. The only information those boxes give is delivery restrictions such as no exposure to sunlight or fragile products inside. In this industry, a lot of resources for making cardboard boxes are involved, yet the boxes themselves still have plenty of unused aspects which, once improved, can decrease the waste and make the packaging experience more pleasant. Sales packaging is a major environmental concern.[1] After all, such containers may impact the environment when they are considered as the carbon credit concern by companies.[2]

The following context of this paper will be divided into three parts. First, to start the project, the relationship between packaging and repackaging will be discussed and demonstrated in order to set this project in both the retailers’ and consumers’ areas for a more practical analysis. Second part will talk about the previous improvements and new ideas on packaging boxes. The third part will be the ideas I collected from the literature and my ideation towards this topic and the final implementation of this project as a self assemble floor lamp is used to be an example showing the design process and final presentation.
CHAPTER 1: “PACKAGING AND REPACKAGING”

Packaging by Manufacturers and Repackaging by Consumers

Packaging can be described as a coordinated system of preparing goods for transport, warehousing, logistics, sale, and end use. Packaging contains, protects, preserves, transports, informs, and sells.[3] Through common knowledge, packaging as an action has been considered the process of putting whatever products in a clean and clear order as they could be able to be taken or delivered. People would do some packaging jobs if they want to deliver something or get temporarily unused stuffs tidied up. In those cases, they can take charge of the whole packaging processes from picking the right boxes to arranging the orders of stuffs put inside. However, try to think that if you want to make a return or change back to the retailers, why the process becomes harder and unpleasant? The reasons can be found in many aspects, however, one major reason making the difference would be who defines the way of packaging, who offers the packaging materials and who would be the keepers of those packages.

For consumer products which are sold along with their packages, manufacturers produced the packages in specific ways depending on the accommodating space needed for certain products, sometimes with inserts as holding the inside content better and tighter. Under these circumstances, manufacturers take in control of physical packages and the packaging methods, which, leave consumers a gap when interacting with the packaging processes. Those professional packages do stand on their spots based on plenty of experiments and exploration from packaging experts, so they are stable and practical both in protecting and accommodating the products inside. Each positioning strategy appears associated with particular packaging dimensions.[4] We as consumers would not know everything from the material choices to space structures in the products’ packages we see every day, but there are some conditions where we have to deal with them by ourselves, without professional instructions.

So when will consumers deal with consumer goods’ packages themselves? When they want to make returns or changes. There are many circumstances in which it is desirable to move a product from a consumer back to a manufacturer, for a variety of reasons.[5] From what I researched, the main reasons for consumers’ returns or
changes are product errors (meaning the products are wrong items/colors/sizes...) or broken/destroyed parts/items (meaning the products consumers receive are somewhat broken so they cannot function the way they are supposed to be). Under these circumstances, it seems like a must for making those returns/changes, otherwise the products could not show their value and consumers will lose their money and be dissatisfied. Consumers then have to deal with the packaging processes, which means they have to repackage what are packaged by the manufacturers, giving the definition of repackaging here. Repackaging, in this project, means consumers package the products in the ways products are packaged in the first place by the manufacturers in order to make returns or changes.

**Why does it matter finding better ways to improve the repackaging experience?**

Packages nowadays play more and more important roles in our daily lives, creating a lot of convenience and pleasure yet leaving some issues as well. Packaging also plays a key role in sustainable development.[6] And when it comes to returning/changing products, packages weigh even heavier and become the direct interaction between consumers and products.

In the modern society, products do not stand alone but have packages come with them as humans have clothes. Similarly, to products, packages function not only as the protection but aesthetics matter as well. Consumers will not just regard packages as the basic container for the items they buy but still part of the product and their impact on supply chain costs and performances can be huge.[7] Packages play a more important role in the consumer goods industry than we think as they have affected consumers’ opinion towards the products and even the retailers in some ways.

For products bought online, packages need to protect the products and also be consumer friendly so consumers can deal with them without any confusion and difficulties. It was found that the management model developed provides companies with a useful quantitative tool to find the “trade-off” between the logistics costs reduction and the differentiation capacity linked to packaging.[8] Emotionally, products’ packages offer consumers the interaction
with the retailers and the products prior to seeing the products. Apart from the functionality and usability, packages can only give whoever deals with them various kinds of emotional experience.[9]

Multi-component products can be found anywhere around us from self assembled furniture to kids’ toys. Often products with many different parts can give people more experience in interaction.

Moreover, the potential relation among the circle of manufactures, retailers and consumers is also strengthened through multi-component products since the messages from these kinds of products are more complicated than one-piece products. Consumers will often go through the process of figuring out all components, understanding them and playing with them. The process is very interesting when it comes to the the service chain that manufacturers and retailers focus on consumers and consumers focus on products. They all want to make the best out of what they really need and message of integration flows in all the processes accompanying the products. Packaging is an essential one of them. In this case, whether consumers can handle multi-component products can depend on the packages to some extent.

Valuable messages are needed in making the packages. For example, “…a package for storing, mixing and dispensing multi-component products in which the components must be maintained separately from one another until just prior to use, and then mixed together for use.”[10]
CHAPTER 2: NEW IDEAS FOR PACKAGING — INTERESTING AND INNOVATIVE

There are many companies or organizations developing new ideas and new ways for traditional packages, the everlasting and unchanged brown cardboard boxes.

IKEA — Moving Day Boxes

This idea was created for IKEA Canada by Leo Burnett Toronto. The so-called Moving Day happened every year on July 1 in the Quebec region in Canada, which calls for plenty of moving boxes. To help the movers out, IKEA placed thousands of free, branded moving boxes all over the streets. The boxes were printed with suggestions on how they could be used as temporary furniture. Those boxes one by one could direct people to IKEA for buying the real pieces by the notes on the box instructions.

Figure 1: IKEA Moving Boxes—Boxed hung out for people to pick up and take to their homes.
IKEA — “Inspiration Boxes”

This is an extension of the Moving Day Boxes Campaign, also created by Leo Burnett Toronto. The Moving Day is a tradition in the Quebec area, Canada. Every year on July 1st, around 225,000 people get their houses moved. For two years, IKEA helped this “campaign” by giving out free moving boxes. In 2014, apart from what IKEA Canada traditionally did, they also gave away paper boxes as inspiration. Those boxes were printed and sized to resemble IKEA storage units and given away across the whole city. On the Moving Day people could use the boxes to move, then see how IKEA products might look in their new homes with the patterns on the boxes. As the elevated version of the moving boxes, the inspiration boxes were made with colorful surface prints to attract even more people.
IKEA Seoul — Box into Box

The idea of Box into Box was put forward by IKEA Seoul aiming to solve the problem that IKEA furniture wasted too much cardboard packaging boxes. The designers in IKEA Seoul thought that instead of just throwing away all the boxes, the larger ones might be somehow reused and recycled with other purposes. So the designers printed the flat patterns of smaller boxes into the larger boxes. Consumers can cut out from the prints inside of the large boxes to get smaller ones and actually use them as containers. Those small boxes contain daily home accessories and even stacked up one inside one or one on one, giving the value of not only protecting the environment but fun experience interacting with the packages for consumers.
Figure 4: IKEA Seoul—Box into Box (1)

Figure 5: IKEA Seoul—Box into Box (2)
Origami — Samsung Foldable Printers

A new line of innovative printers have been created by Samsung using unconventional materials. One of the product is the Origami. The printers were made just like those traditional printers on the inside for the mechanical part but with a cardboard cover case. Consumers were able to build the cover for the printer by folding up the cardboard by the printed information on box surfaces within minutes.
Figure 7: Samsung Foldable Printers
 CHAPTER 3: The Inside Story of packaging boxes — Packaging Graphic

Instructions

Design Ideation

I started my topic of dealing with the repackaging experience from one of my own life experiences, so I started to expand my thoughts from that point and developed deeper and deeper into all the necessary aspects connected with the key words such as multi-component, packaging and repackaging, retailers, manufacturers, consumer experience, etc.

Figure 8: Design Ideation (1)
1. The start of my interest in the topic came from one of my own purchasing experience. I listed some of the difficulties I noticed when I did the repackaging processes.

2. From the key words I started brainstorming about the topic area and expand my thinking area.
3. From my online research, I put down some information about returning and changing products, some logistics barriers trying to figure out the issues in the interaction process between consumers and packages, packages and packages, consumers and retailers, retailers and packages.
4. I began to do some free thinking based on what I observed and researched. I started to form some ideas considering all the parts in the repackaging chain which includes packages themselves, retailers, consumers and logistics.
5. About the physical package: I started to think about the structure, material choice and function that could possibly happen in the package boxes themselves.
6. About the consumers’ need in the packaging processes. I tried to give some ideas about how to make packages simpler to deal with and be more versatile.
7. For retailers and logistics concern, I come up with several ideas on how to encourage consumers to pack items back into the original package in order to save energy and time.
Design Methodology

Several steps were taken towards working with this topic.

To begin with, since the topic of repackaging came from one of my own life experiences, some different kind of physical packages were used for the package detail study. And the open boxes process was done by my friends and me after receiving some small multi-component products purchased both online and in store. Then, of course, we put back all the parts into the same packages and record the processes, time and levels of difficulty.

After that, more literature materials were gone through to get more support academically.

Then, after organizing all the materials collected and the information from the project discussion, the process of making physical models was started.

After the model making process several user tests were done in order to make the decision of the exact direction towards the development of the project. Then, some data was collected and since the project went deeper, more ideas and details were added to polish the models.

Conceptual Experimental Testing

In order to understand better about people’s behavioral habits towards packaging, two conceptual experimental tests based on the chosen direction were taken to collect some further information and data and analysis afterwards was done based on the testing result to improve the project with better solutions to work on.

Experiment 1: Objects Outline Graphic Instructions Contrastive Test

Two small packaging boxes were used as containers for the inside pieces. The inside pieces were varieties of shapes cut out of foam. They were put together in a specific order as stimulating the real packaged products. One box was drawn with the outlines of the shapes on the inside bottom surface and one was left blank. Then the users were asked
to put the shapes back into the two boxes and tried to fill in the box as tidy as possible to cover the bottom with the least blank space.

Users can put back all the foam pieces without obvious difficulties in the box with graphic instructions, most of them only spent less than one minute.

For the box without graphic instructions, users would try to fit in all the foam parts based on the sizes and shapes. Usually, they arrange the positions for bigger pieces first then smaller ones, easy shapes first then complex ones. The result turned out that when the third person opened the box, the foam pieces were put together seemingly tidy, yet two or three small pieces were left out.

From this experiment, the results showed that when the content inside of the packaging box is specifically arranged, once messed up, will be very hard to be returned to the original positions. This can be transferred into the real
conditions where products were packaged specifically so once they are taken out, consumers would have great difficulties restoring.

**Experiment 2: Box Enlargement**

![Figure 16 (series): Experiment 2 : Box Enlargement](image-url)
In this experiment a paper-made box was used as the testing tool. The side walls, top and bottom were all double layered so they could be taken out to form a larger box, which in this project, would help solving the problem of not having enough space when things need to be put back into the original container as the primary arrangements.

Users for this experiment found it very challenging restructuring the box (enlarging), which left the testing time extending much than expected. The reaction from users was most about the complex structure when dealing with the enlarging process with the original box. They did agree that with this method, the problem could be somewhat solved or at least weakened due to the flexibility of the containing space, yet the actual experience realizing the function could be harder than what normal consumers could handle.

So after these two conceptual experiments, collecting all the feedback and data from the users. The directer and more efficient way was chosen—graphic instructions. The improvement of the box structures could still be considered but would be put in the second place.

**Final Design: A Self Assemble Floor Lamp as The Example for The Design Implementation**

From where this project topic came from, the self assemble floor lamp was chosen as the example for implementing the final design to draw the circle full.

For these kind of home accessories, especially the self assemble ones, multiple parts are big concern for packaging. In order to hold each and every part safe and tight, an insert is always involved in the condition.

So when consumers buy what they need from the retailers, the products usually come with a packaging box and an insert box, something several protecting cushions and the product instructions, etc.

The insert is very hard to read for normal consumers since it is molded out of recycled cardboard pulp and structured in a specific and scientific way. However, if consumers want to put whatever inside the box, they have to put all part back into the insert first then put the inset box back into the out box and fold tight to make either returns or changes.
Figure 17: Packaging order for the self assemble lamp as the design implementation example.

So after how the lamp parts were actually packaged were learnt, the appropriate ways for the graphic instructions were found to actually function as guide to consumers when they need to put the products back into the original packages.
Above is the first version of the graphic instruction design for the lamp. After this version, some advice was collected by asking people around me. Most comments were that the graphics looked much like technical drawings, they are...
too complicated with all those lines and shapes, the distinction of the line weights were not obvious enough to understand the structure of the lamp parts and the insert boxes.

So based on those comments, a second version of the graphic instructions was developed.
The second version of the design is as above. Different colors were used to distinguish the insert structures and the lamp components. Also, step-by-step graphics were put onto the package as the guiding images displaying more views of each component so consumers would understand the graphics better.

Based on this version of design, a testing report was made, trying to collecting more valuable feedback in order to going for the final design.
TESTING REPORT

PURPOSE
To use a mockup model testing people’s behavior of reading and understand information on the inside of the package. Get feedback of the clearance of graphic instructions and what is missing or vague, what can be improved or redone.

TARGET USERS
Everyone between 14-70 who sometimes deal with packaging and repackaging.

PROCESS
1. Using the laser-cut cardboard package box as a template to be mounted with papers on two surfaces, giving information of positioning and placing orders of all components that should be contained in the insert.
2. Let people using the graphic instructions on the inside of the package as the guide to do the repackaging job.
3. Take notes of people's behaviors when using the model and the reaction when reading the instruction along with the repackaging process.
4. Record the time everyone use from starting to finishing packaging.
5. Ask users about their feeling when using the instruction system and which part they feel unclear and confusing.
6. Make recording form to organize and compare the results.
RESULT FORM

<table>
<thead>
<tr>
<th>Name</th>
<th>Time</th>
<th>result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jiaqi</td>
<td>40s</td>
<td>finished</td>
</tr>
<tr>
<td>Rita</td>
<td>2min 08s</td>
<td>unfinished</td>
</tr>
<tr>
<td>Kaijun</td>
<td>1min 25s</td>
<td>finished</td>
</tr>
<tr>
<td>Hanxi</td>
<td>57s</td>
<td>finished</td>
</tr>
<tr>
<td>Yishan</td>
<td>1min 14s</td>
<td>finished</td>
</tr>
<tr>
<td>Yali</td>
<td>3min 11s</td>
<td>unfinished</td>
</tr>
<tr>
<td>Ziye</td>
<td>47s</td>
<td>finished</td>
</tr>
</tbody>
</table>

FEEDBACK

All the respondents gave their opinions and feedback about their using experience. After organizing, the feedback is as follows:

1. Components with similar shapes can be a little hard to distinguish from each other. Users tended to hesitate about differentiating the similar shapes.

2. Direction instructions can be needed to some components with specific direction of placing into the insert.

3. Sometimes one component has multiple shapes as it needs to be bent or reshaped when being packaged. Thus some specific shape must be contained in the specific area to guarantee all the other shapes can be afterwards placed nicely.

4. The print for the insert area can be heavier or emphasized more in order to better guide the positions for afterwards repackaging.

5. The way of opening the package is horizontally is better than vertically yet there are potentially better ways of opening and closing the packaging box in order to better delivering the message inside.

6. The color difference of the bigger image of the whole packaged items is fine for distinguishing each part from another. But with products with even more components, only different colors may not be enough.
7. The way of closing the packaging box can also be important also if using some graphic instructions as positioning information.

PICTURES

Figure 21: User Test of the Second Version Graphic Instruction Design
Based on the advice above, I made the final design for this project.

Figure 22: Final version of the graphic instruction design (1)
The left one shows the altogether positioning of all the component parts which is printed on the inside bottom of the out cardboard box. The right one show the steps for arranging the positions for the four parts of the lamp.
Figure 24: The Final Model: Graphic instructions silkscreen printed on cardboards.

For the final thesis show, the above prints were made on cardboard sheets and assemble them into one unfolded packaging box which could let the people coming to the show see how the final design will actually work on the real material and what it would look like when the graphic instructions translated into the real packaging language.
CONCLUSION

From the primary ideation to the final design model showing in the gallery, a long journey has been taken to the realization of an early idea.

The idea for this project came as an innovative design strategy for the packaging industry. It did not aim at a new product but more of design thinking and problem solving. The topic pick was from my own story which drew out more practical response from myself and drove me to work on it with more personal passion and willingness. Starting from that point, many researches have been taken from the early idea formation to the background study.

The actual design process was done by several steps:

1. Brainstorming and Ideation.
2. Direction pick.
3. Item as the design media chosen—the self assemble floor lamp.
4. Designing multiple versions of the graphic instructions and asking for advice and feedback.
5. Choosing the final design and detailing it.
6. Determining the method/media for showing the design.
7. Making the physical model for the design.
8. Show the design.

Through the steps above, the design of the graphic instructions for repacking has been accomplished. Looking back to the problem statement, the final design addressed the point and answer the question. The graphic instructions on the inside of the packages could be seen and showing useful information to consumers after they open the products. So when the consumers want to return or make a change of the product inside they can use the graphic instructions to guide them successfully accomplishing the repackaging process without the confuse of the positions and orders for the items inside, especially for those with multiple parts.

This project shows a new way to think about the inside of a package, which, can be seen as an efficient way to reasonably use the empty space and add value to it.
In the future, more examples of different products can be introduced in this project to show the potential of this design strategy to be implemented in the real manufacturing world to give convenience to consumers.
REFERENCES


