Rahhal: Furniture with value for the nomadic experience

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RAHHAL

Furniture with value for the nomadic experience

By Aisha Iskanderani

A Thesis in Partial Fulfillment of the Requirements for the of Master of Fine Arts Degree in Industrial Design

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Abstract
There are many situations in which people need to move from place to place. But how can they take everything with them? Since the way people interact with their furniture is very fascinating to me, I am calling this “the moving situation.” When people move, they tend to take their furniture with them, however, moving a dining table is very difficult and expensive. As a result, people will either discard or donate it.

I focused my research specifically on the dining table. It was a fascinating journey to study the functionality, aesthetics, ergonomics, and design of this centerpiece of any home environment. People create a special emotional attachment to their dining table which can last for a lifetime due to its usability and pleasure.
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Chapter I

Introduction of the Study

Proposal
Problem Statement
Why Portability in the Home Environment?
Thesis Objectives
Proposal

Overview

Everyday people use many different objects. Some of these objects survive while others go to landfills. Other objects people remember throughout their lives and tend to keep. Designers should be aware of the effects of people having all these products that they design but then are discarded. Wasting materials, labor, and time making new products that will not last for a long time is an extremely crucial concern in the modern era.

Emotions

First impressions touch our heart first then our mind. Emotional effects vary between people but there are similarities. According to the Oxford Dictionary, emotion means “a strong feeling deriving from one’s circumstances, mood, or relationships with others; instinctive or intuitive feeling as distinguished from reasoning or knowledge.” Don Norman, the Director of the Design Lab at the University of California, stated in his book Emotional Design: Why We Love (or Hate) Everyday Things that emotions and especially positive ones increase a person’s imagination and creativity. Connecting these happy feelings with a product would improve its chances of surviving for a longer time with the user without going to waste. Recently, emotional design is getting more and more attention from designers who really care about the end user and the end environment.

Furniture

People own many kinds of furniture in different spaces, and furniture is one type of object that people deal with daily. Between home, office, or school, people interact, use, and live with furniture. Some furniture pieces age over time from context to context, while others do not. These different situations evoke different emotions that reflect either positively or negatively on the user environment and the world. This user-product experience is an interesting relationship that I want to improve as a
Connections

Building this connection between the user and furniture is very tricky. It involves many different and difficult decisions for the designer. Buying new furniture pieces many times over many years is not always the right thing to do. Aged furniture maintains memories, attachment, and relationships. But how can users keep their furniture pieces throughout the years? In reality, people do not stay and live in one specific place; they move from place to place many times during their lives. Furniture should have an emotional connection and the ability to be assembled and disassembled very easily and quickly. And that is what I want to explore in my thesis.
Problem Statement
A long time ago, people used to own their furniture for many years, inheriting it and giving it to their children and so on. Today, furniture is seen being thrown away in landfills. In our constantly changing lifestyles, people tend to move many times during their lifetimes. Therefore, designers must solve many issues like weight and assembling and dissembling for ease of use.

Problems
• Huge furniture pieces take up a tremendous amount of space.
• Low quality pieces of furniture.
• Difficult to assemble furniture.
• Difficult to disassemble furniture.
• Easy to break.
• Heavy in weight when moving around.
• Has many small parts that could be lost.
• Longevity issues.
Why Portability in the Home Environment?

People cannot empathize with furniture on the market now, especially when they move. People tend to want to keep their furniture if it is easy to move and doesn’t cost them a lot of money. However, the way people used to move furniture in the past is the same as it is now.

For the dining table, it is not only a table for having daily meals on; it is much more than that. It is a place where the family gets together during good and bad times, to share stories, to plan for celebrations, or to find solutions for dramatic challenges in their lives. It is a place where everyone can get together and plan for a trip, plan for the future, or plan for a surprise party; a place where a lot of memories take place and are always remembered. Dining tables will always have that hint of emotional attachment that we don’t want to let go of. That is why I believe in the importance of having a product designed to be durable and easy to move. Such a product would enable families to keep their memories for longer than a lifetime and would be able to be moved from one home to another.

The current market is not fulfilling this need for these kinds of users. People now buy furniture that never breaks apart, or they buy Ikea furniture. What if I design a product for people that does not look very weak but at the same time is easy to assemble and disassemble? This is my challenge.
Thesis Objectives

**Design a dining table that:**

- Is easy to transfer from place to place.
- Is easy to assemble and disassemble.
- Is easy to use.
- Creates more interactive and creative storage areas.
- Introduces multiple levels.
- Improves the human factor and ergonomics.
- Creates playful and joyful experiences.
- Develops a breakthrough design for eating and other activities.
Chapter II

Research Areas

Emotional Research
Furniture Research
Cultural Research
Material Research
What does emotion mean?

In his Ph.D. research on Designing Emotions, Pieter Desmet, a professor at Delft University, stated that “emotions is: the felt tendency toward anything intuitively appraised as good (beneficial), or away from anything intuitively appraised as bad (harmful).”

Emotions are multicomponent entities, for example, an explosive reaction such as smiling, a physiological reaction such as a heart rate, a behavioral reaction such as approaching, and a subjective feeling such as feeling happy (Desmet 2002, 39).

In the beginning of my research about emotional attachment to certain products, I had an opinion about the relationship between the user and his own possessions. Sometimes, people become attached to specific objects that they own because it reminds them of a certain memory, a person, or an event. For example, my old memory box contains a chain, some memorable cards, and childhood gifts from my teachers. I believe memory comes from various factors, such as the giver, the event, the object itself, and the time we received it.

For an object to be emotional to the person who owns it, it is the person’s usage of this specific object over time that matters. Sometimes we do not like the product from the first moment we get it, but after we have it for a period of time or our family
uses it, the object will hold all the memories associated with it and it will become more emotional to the us.

The giver of an object is a very sensitive subject, too. Most of the time, people keep their gift because it reminds them of the person who gave it to them and the event over which they got it. The object evokes memories, emotions, attachment, connection, and love... and even hate, like for an ugly wooden table. For example, a crib for children that will last generations, photos that will last for many years, and books that may not be for reading any more all hold memories and have sentimental qualities.

Most of the time, if the user builds his own object, he will feel pride, and this feeling will make him more attached to the object. Ikea is a huge fan of do-it-yourself (DIY) products.

Heritage products and objects play a huge role in this attachment with the keeper. Sometimes a very simple gift from a special person makes an object memorable. On the other hand, a very expensive gift from people that we barely know may make an object hated.

**Usability**

As Patrick Jordan said in his article “Human factors for pleasure in product use,” usability is a crucial factor for a product to be pleasurable. I think it makes sense, because if the user of a certain product keeps using it for a long time, he definitely developed a relationship with this product. One of the secrets for a good product is reliability. The product is reliable to the user, and he knows that each time he wants to use it he will be satisfied with it.
When I researched how to build an emotional connection between the user and the object, I found that:

1. Emotion is a very subjective entity.
2. It depends on touch, feel, look, use, experience, memories, history, culture, and emotion.
3. How the user evaluates the product and connects it to his world is the key factor for the emotional attachment to the product.
4. Human behaviors are different from person to person and from time to time.
5. Length of time is a key factor for building a connection.
6. People become attached to specific objects for many reasons, such as the object is a gift from loved ones or a special designer, it invokes special moments, or it is a legacy or inheritance.
Furniture Research | Dining Tables

People always have different opinions about furniture as objects that they own, buy, sell, inherit, and use. However, this relationship lacks commitment and a connection. Furniture can be considered an extension of the human body that is placed on the ground. People need to sit, so there is a chair (Mastelli and Kelsey 2001, 56-57). But the challenge is how to make this relationship more than this. The interaction between the object and the user is what matters. There is no guarantee how people will react to it.

What is the fine line between functionalism and aesthetics? I want my dining table to be functional, but at the same time I want it to be beautiful and elegant. This is the dilemma for every designer. A table is not just a surface to put things on, it’s the interaction between this surface and the human being who is using it. With a table, people eat on it, do crafts, open their packages, drink, gather, socialize, and talk. All these activities happen on this one surface. It is one object, yet the interaction between the user and this object is without limits. It becomes part of the many memories from the user’s life that made him happy. He may want to carry these memories on with them whenever he leaves and wherever he lives.

Form and shape

Curvilinear lines are more welcoming and pleasant for users in function and feel. Many iconic products have curved lines in their design. Curved lines are more natural for people to interact with. Our human body and nature around us do not have straight lines. Straight lines give the sense of control and stability, but there are many other principles of design that give same meaning but in different ways.

Shakers furniture

I researched different movements in different eras, and one of the most interesting ones that I found was the Shaker movement in the United States. Their furniture was
characterized by its minimalism, simplicity, functionality, and elegance. Although their furniture production was very small, it was a prominent movement here in the States.

Examples of different life styles

The dining experience differs from one culture to another, as I will mention in the following section. For example, in the Japanese tradition, people sit on the floor or a small cushion and dine on a lower elevation, while in Europe; people use higher tables and sit on chairs. This insight sparked me to create the option of using the same table at different heights to accommodate various cultures’ needs.
Cultural Research

There are many cultures, such as Japanese and Middle Eastern, that use the ground as part of the seating experience. I wanted to integrate this cultural aspect into my final design. It is fascinating how these cultural habits have spread or declined from generation to generation. In my Saudi Arabian culture, we sometimes use the ground to sit, but now it’s not very common. With today’s modern urban lifestyle, people tend to use regular British or French dining tables. But in my family, we sometimes like to spend some time together on the floor and have our dinner gathering around a small cloth. Actually, these are the best memories that I have from my past.

Sitting on the floor

It is so interesting to me how cultures vary in the way they sit and eat. Although all people have the same human body structure, the way they sit is different according to their surrounding environment. For instance, in the American culture, people never use the floor as part of their dining tradition for everyday meals. They sit on chairs at tables to eat their meals, the same as Europeans. On the other hand, many Asian and Middle Eastern cultures use the floor as part of their furniture while eating their meals. In Japan, they have an interesting kind of floor chair or seat and use an extremely low dining table to enjoy their meals. In the Middle East, they use the floor as seats and tables in many cases, or they use low tables. While some people use tables and chairs for dining, some cultures still keep their traditions and still facilitate the floor as part of their furniture line.
Testing of sitting on the floor

This is one of my classmates, Timothy Bromm, with whom I have talked about this topic. He was not very comfortable at my low table that I made for testing. He could not even continue his lunch with me on the floor. However, he was telling me how Americans do sit on the floor sometimes while watching movies or having a cozy time with friends around the coffee table.
Materials Research

How materials convey a certain emotional response

Designers should pay attention to the experiences their products are intended for. These experiences are related to different qualities and subjective matters because they depend on the user's mind and heart at certain moments and according to time and context. Use of various materials is related to the meaning of an experience in a particular context (Karana 2010).

The ways different kinds of materials convey different meaning in different contexts depend on the ways various cultures see materials differently.

Here are some universal meanings for materials:

Wood: cozy, warm, inviting, natural.
Metal: cold, sharp, heavy.
Plastics: cheap, light, flexible.
Glass: transparent, fragile, expensive.
Fabrics: light, flexible.

Of all the materials I focused on in my search, I found that wood has historical meaning to designers who have used it over the years in making and producing furniture. Wood is the best emotional absorber and endures for a long time. Through human history, people have used wood in manufacturing most of their furniture for different reasons. Natural wood has the durability factor in it that allows furniture to last longer. In addition, wood colors and grain textures add a classic elegant look to the product in both attractiveness and timelessness. Having the durability and the timelessness of wood as factors in my product allows it to serve the emotional connection that people look for.
Pictures of different tables in different materials

Metal furniture

Glass furniture

Cement furniture

Wood furniture
Chapter IV

Analysis
Current Situation and Observations
Survey
Target User
Environment State
Technology State
Benchmarking
Current Situation and Observation

I want to introduce some facts about the furniture industry.

1. From 2012 to 2013, 35.9 million people in the United States have moved out of their homes. The reasons for moving can be classified into four categories: family-related, employment-related, housing-related, and other (growing market). When people move from place to place, they tend to throw out their furniture, sell it, or donate it for various reasons. Some people don’t want the hassle of disassembly, others cannot move their huge and heavy pieces of furniture that would cost a lot of money to move, others are too lazy to do that. This is typical with the middle to low middle class. People tend to buy cheap furniture so that when they move they can just give it away without feeling like they spent too much money.

2. The average apartment size is 982 square feet, and it keeps shrinking year after a year. As a result of these new tiny spaces that people live in, other factors in life are changing, such as the need for fewer and smaller furniture. People now cannot buy and use huge pieces of furniture that are going to take up space and cost money, so instead they are buying smaller furniture pieces and multifunctional pieces. The need for affordable multipurpose, smaller furniture is growing with the new life style.
3. By its nature, furniture requires large spaces for storage in both retail floors and storage warehouses, which affect the costs of selling furniture. This leads to an increase in prices. Furniture is hard to handle as it goes through the cycle from being raw materials to becoming final products that are delivered to the end user. Combined, this leads to doubling the prices of furniture. Large furniture increases the prices of manufacturing, cost selling, materials, and related services for the furniture industries.
Mind map

I have looked at this situation from many different factors such as: the emotional side, traditions, cultures, history, technologies, materials, functionality, environment, and ergonomics. At each side, I discovered different insights and outcomes from my research.
Survey
Since I was interested in the emotional side of the relationship that grows between the user and an object, I decided to ask various people about this attachment to learn more about it. I also wanted to understand the volition in people about keeping their own objects and their connection to them. Nearly 170 people from around the world participated.

From the survey:
Question 3: What is it?
From the answers that I got:
Teddy bear, house, cell phone, coffee mug, pictures, Christmas ornament, and notebook. The highest number of answers was the cell phone.

Question 4: Why is this object special to you?
For the cell phone...
“It keeps all of my information, tells time, and keeps all my friends’ numbers in one place.”
“Connection to family and the world.”
“I don’t feel comfortable without it.”
“Because it has many functions: Phone, calculator, currency converter, games, Internet, Internet calling, memo, camera, and much more. You don’t have to carry many devices.”

For the Christmas ornament...
“It reminds me of my childhood and traditions, plus my mom put a special emphasis on Christmas when I was growing up.”

For the coffee mug...
“It was a gift from a dear friend.”
For the home...
“Because it’s where the story of my life begins.”

**Insights**
I realized that some people have the will to keep objects for a very long time when they have attachments to them. They are a reminder of a special phenomenon between the user and the object that grows stronger with time.
Knowing people keep objects for a long time makes me think more about this connection and how I can use it as a designer for the product’s benefit. What makes a user hold on to a product or get rid of it is very fascinating to me as a designer. Thinking about good designs and bad designs, sometimes designers trust their intuition and forget about the user experience, yet not all designers are this way. I believe that the user experience should always come first in a good design. Making the user the center of the design will make the connection to the furniture stronger and longer.

I still wonder how people react to drastic changes in their lives and if they are really willing to take their furniture pieces with them everywhere they go. This is a big question for me. Also, will they remember how to assemble and disassemble the pieces, or will they refuse to attempt it?
Target User

In the beginning of forming my target user group, I was considering a larger group of people consisting of single young people to families. However, after discussing with my advisors and based on my research, I decided to be more concise in choosing my target market, which I chose as the young generation.

The young generation, middle to high middle class people between 20 and 30 years old, are following their dreams wherever they are.

The focus of this segment is based on their lifestyle. From my research, I have found that people move around more when they are between 20 and 30 years old. This matched the value I am proposing that my product should be easy to pack and unpack allowing people to mobilize faster. Also, most of the memories and emotional attachment to a product take place when people are in the early stages of building their lives. Having what they own for a longer period of time will allow them to build the deep emotional attachment that I am looking for.
Environment State

After I defined my target group as the young movers of the generation, my next step is to understand where they live, the lifestyle they adopt, and the problems they deal with daily in their environments. These target groups exist in extremely small sized apartments, dorms, and shared houses. They need every inch of their space to be functional so they can perform their daily activities.

As much as they need their spaces, they also consider the design and style of their furniture pieces. In my research about all the details of their environment, I focused on the dining area.

Specifically, this area is part of the kitchen or a zone outside the kitchen. It is where they put their stuff, have meals, have conversations with their friends, and work on their homework. It is the hub of any residential environment.

Examples


Floor plan example

There are many problems accompanying this zone:

• Clutters of things are put on the table.
• There is no storage within the table or even around the dining table.
• Because users use it for many activities, it becomes a destination for many things around the house.
• It is not enough space for users to do different activities.
• It is not flexible to move or to be used around the house.
• Usually, it is created from very cheap materials.
The possibilities in furniture production are endless. Sometimes it depends on the material, and other times on the design itself. In my thesis project, I am focusing on the emotional factor of owing furniture and living with it for a lifetime. Other research has shown that by making and assembling the product and engaging in the process, people feel more connected and emotionally attached to the product. Consequently, in my thesis illustration, I chose a minimal and intuitive way of thinking about the product and achieving my intention of increasing the connection between the user and the product. I also wanted to experiment with different materials in my design. In the end, less is more.
Benchmarking

With a lot of examination about the market and how many designers perused this problem, I am going to introduce some companies and ideas.

Ikea PS concept

“For people and homes in constant motion IKEA PS 2014 is our 8th PS collection. This time we’ve taken inspiration from the way people live today, often in unconventional spaces and never in one place for long. Created by 20 designers, the IKEA PS 2014 products offer flexible solutions for young-in-mind urban people living ‘in the moment’.” (IKEA website)


62%
Say design products for the home are too expensive others than family

59%
Agree they need to use every inch of their home efficiently

59%
Live in an apartment

49%
Rent their home

29%
Moved 2 times or more

22%
Of people share their home with others than family

17%
Live in less than 30 M²

15%
Do not know how long they can stay in their present accommodation

“In January 2014, YouGov performed on behalf of IKEA among people aged 18-60 living in cities in Sweden, UK, France, Poland, Japan, China, and Qatar. In each country, 1000 people were included in the survey.” (Ikea website)
Ikea is the leading company in the DIY assembly furniture market and offers very affordable home appliances and furniture that matches most of their customers tastes and lifestyles. They focus on the moving generation by producing new and different collections that are easy to put together and move. In addition, Ikea is well known for their simple, modern, and renewed styles with every season. They have stores all over the world from the Far East to the Americas. One of their largest groups of customers is people who are between 20 and 30 years old who seek a modern lifestyle.

Ikea products are packed in a flat packaging system that makes it extremely portable for shipping worldwide. From the customer feedback that I did about Ikea furniture, people said it was low quality, has too many parts, and has very hard to follow instructions, which is true even for me. I buy a lot of Ikea products, and when I came to the United States, I looked for an Ikea store as my first choice to buy affordable furniture for my stay here. I found everything I needed in their store.

**Examples of Ikea products**
**Broom chair**


“Broom Chair: Like its name suggests, the chair assemblage was inspired by how brooms are assembled, offering the maximum simplicity to mount. When dismounted it can be stored in a minimum space. This is something that goes beyond the mere shape of the objects, embodying feelings of satisfaction, fun and proud of owning. Another issue that cannot be forgotten is that the increasing population living in concentrated areas dictates the need for greater efficiency of space, storage and costs. The project focused on how shipping the product using a minimum space and consuming minimal material for packaging while providing easy storage and stockpiling. Composed of a WPC seat and nine FSC wooden screw top sticks, this chair is fully detachable, super easy to store, transport and assemble. The sticks are screwed directly to the seats. This project is very simple and its fabrication requires very little steps. No decorative elements make the manufacturing simple, easy and inexpensive. The fact of not requiring the use of glue, nails, screws, metal components, etc., improves the manufacturing process. Material: – Packaging: Egg cartoon like material. – Legs/backrest of the chair: FSC certificated Birch Wood. – Seat: Injection molded WPC (Wood Plastic Composite).”
This is a very interesting example of ease of assembling, storing, and shipping. The designer was inspired by the broom technique, which is a simple and easy approach for his design. The portability of the product and the simplicity of materials inspired me a lot in my research. Likewise, giving the user the ability to customize the chairs will make them more personal. Their ease of shipment is also very efficient and sustainable.
For the modern nomad
Designer: André Pedrini & Ricardo Freisleben
Source: http://www.yankodesign.com/2013/03/13/for-the-modern-nomad/

“If you’ve ever moved into a new place without furniture or anywhere to hang your clothes, you’ll appreciate the Arara Nômade. It’s an all-in-one solution for organizing clothes packed into one compact box. No screws, no glues, no technical know-how... just one intuitive structure that’s easily mounted or un-mounted. Perfect for the modern nomad or anyone who needs a quick closet solution!”

The design is very compact and portable. One package can fit a small closet, which makes it easy to mount and un-mount for a new adventure. One of the issues I found is that it has many parts which makes it hard to know how to put it together. The usage of materials and colors makes it customizable and desired by users.
Boxed kit packs office furniture into a portable briefcase

Designer: Tyrone Stoddart

Source: http://www.gizmag.com/boxed-office/28490/

“Laptops and mobile phones may have ushered in the age of the road warrior by freeing us from the confines of the office, but young Scottish designer Tyrone Stoddart has gone one step further by designing a kit that transforms a briefcase into office furniture. Dubbed Boxed, the kit contains various bits and pieces that can be assembled to make a height-adjustable desk, two stools and lamp. Once you’ve completed your office duties, all the parts can disassemble and placed back into the case for your next portable meeting or transformed into a coffee table and two stools. While the kit is designed for indoor use, we also think this is a great idea (or excuse) for taking the office outdoors.”

Likewise, the Arara Nomada closet package Boxed solution is a very similar concept but for a small office. It is very compact, modest, and looks lightweight. However, it does not appear sturdy and strong enough to endure long. And the choice of the wood gives me the feeling of low quality material. Yet, as a concept, it’s very practical but it needs some adjustments.
Modern nomad’s kit

Designer: Nina Woronecka

Source: http://offsomedesign.com/modern-nomads-kit-2/

“Nomada is a furniture DIY kit designed by Nina Woronecka. Nomada is a modular set of basic furniture – light, easy to assemble and creating one, mobile piece. There is also a space for all private things of the user. The main idea of creating such set is the philosophy of having less. Minimalism trend becomes more and more popular. On one hand young people are fed up with culture of materialism on the other the 21st century society is very mobile and people live dynamically. During frequent removals the main problem is the dimensions and weight of the furniture, as well as the assembling process. Nomada responds to all this needs.”

In this concept, it is a full room in one package. It is amazing how many different products the designer packed into the container. It is extremely compact and simply designed. However, I still observe some durability issues for this product.
**Benchmarking Insights**

**Self-assembly (DIY)**
I prefer the DIY method for a furniture product to be handled by the user. The emotional attachment to the product will increase and the feeling of pride to create something is very valuable. Also, it makes the price go down considerably, which my target users prefer. For the American market, people always prefer to make their own stuff, and that is in tune with my goals.

**Storage system**
To have and offer a storage system for the user is very important and crucial. Users tend to want to organize their clutter, but the products usually do not help. Storing things in the same zone as the product is very helpful for users.

**Intuitive design (simplicity)**
With too many parts come complains and problems. The least number of parts makes the product much simpler and easier for the user to understand. Furthermore, the more intuitive the design is, the more usable it will be.

**Aesthetics**
All the styles that I researched and the new products that I mentioned are heading toward a modern and simple style and design. Having crisp lines and simple forms and shapes makes it easier to understand and like.

**Production ease**
Using fewer materials, a creative design, and fewer parts will make production simpler and faster.
Chapter IV

**Design Process**

Directions

Refined Direction (Why?)

Design Development Process

User Testing

Prototyping
Directions
After I did my research and analyzed all the details, I started brainstorming some ideas and concepts. A dining table contains a surface for serving, in some cases has storage drawers for storing dining ware, and of course chairs or benches around the table for sitting.

Illustration of a dining table parts

For any residential area, a dining table serves more than dining. Users tend to fulfill their needs around it by doing many activities such as eating, working, talking, crafting, gathering, and more. It is the decision-making area and where they share group memories together.

Each part of the dining table has a special relation to the user and the surrounding environment. First, the surface is used for many activities, such as eating different meals, working on daily tasks, gathering with friends, making arts and crafts, and cluttering up with daily stuff. Second, drawers and sometimes shelves are used to store many objects but an annoying problem is cluttering them up with stuff not related to dining. Third, chairs are obviously used for seating, but most of the time they can be used in different areas around the house.

In my initial thinking, I have focused on:
• The interaction between the user and the table.
• The storage zone for storing dining ware.
• The connection and attachment impact on the user.
• A new way for portability and mobility.
Direction 1 | Surfaces
In my first concept, I was trying to find a new way of dining on a table by using multiple surfaces, different levels, and different shapes. I tried to explore different scenarios for using a dining table.

The first scenario | The core
Surfaces are like family members. Each piece has a different character by itself as an individual family member, yet when they are combined they show the character of the family as a whole. In addition, they have the ability to serve as a guest station when combined.

Sketches
The second scenario | The interaction

In this concept, I focused more on the interaction between the user and the surface by making the activities more enjoyable and different.

Sketches
Small-scale exploration mockups
The third scenario | The function

Lastly, this concept is about the Life Pile. It is about a storage-designated area for the tableware like dishes, cups, or any other pile on the table. When the user goes to eat on the surface, he flips the sides on the storage area and starts to enjoy the meal.

Sketches
Small-scale exploration mockups
Direction 2 | The mobility

In this direction, I was more concerned about the storage issues and portability issues at this point. Also, I considered the idea of the ease of assembling and disassembling for moving situations. I was trying to find a solution for having fewer parts and containing all the table parts in one space or storage area. To make it a more interesting concept, the area for storing the parts would be the same area for storing objects when the table is open. By using limited parts for assembly, this will make it easier for the user to open it and put it back together for mobility.

Sketches
The first scenario | The supported legs

In this solution, the two wooden surfaces will sit on a four-leg structure that will hold the box by a groove on it.

3d exploration and mockups
**The second scenario | The frame nested box**

In this solution, the frame creates the structure of the table. Then, two wooden surfaces set on the frame. The storage area is where all the different parts could be placed during moving and storing, and can be used as a storage area for tableware. In addition, it will include two handles that would also work as the part that sits on the frame.

*3d exploration*

![Image of the frame nested box]

**The third scenario | The supported box**

The box structure will contain four leg holders to support the table. Two wooden surfaces will sit on squared section pieces that will hold them together.

*3d exploration and mockup*

![Image of the supported box]
Refined Direction (why?)

I chose to continue using the second direction—the supported box scenario. I came to this realization after discussing the different directions with my advisors and matching all the different scenarios with my thesis project’s goals. I took the decision to continue my thesis studies using the supported box concept. According to feasibility, intuitiveness, and ingenuity, I decided to develop the concept and started building my first testing mockup.
Design Development Process

The first mockup
The concept is an enclosed dining table system. The box/container part holds all the table parts and pieces together to keep them organized and compact inside. The container is kept closed with two latch straps that are used for moving systems. The top of the container consists of two top parts that will be the table surface. Inside the container will be the table legs, chairs, and some hardware.

At this time, I had believed that the design was done. Yet after trying many times opening and closing the container area, testing the mockup, and shooting a video of myself doing it, I discovered several insights:

- My first testing of the concept was successful. It took me almost 1:40 minutes to assemble the table and disassemble it.
- The way that the straps go around the box is not the perfect solution, the legs are wobbly, and the top dining part is hard to plug into the box.
- The legs are very unstable at the moment because they are not attached very well. I

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should think more about the connection to help in this situation.

- The two top parts take time to go inside the holders, and that should be redesigned in a new way.
- At the moment, there are around eight steps to put the table together, and it should be less than that.
- I should think more about hinges and different ways of attaching the tops to the box container.

**Some of my colleagues’ comments/thoughts:**

- Have arms or any sort of hands for holding the container.
- Think about connecting the two top parts together for keeping the food. Transport the container with wheels for ease of mobility.
- The holding parts are small but should be larger. Make the inside part have the ability to adjust like a kitchen cabinet.

After evaluating my first trial, I started my second trial.
The second mock up
At this stage, I was trying to focus on all the areas that need development. Between trial and error, sketching, creating, and specially asking for advice from my advisors, I was moving forward in my thought and design process.

1. Studying the top parts
How will the container close?
One of my concerns was the container/box closing technique, how the two top leaves will close together to seal the container. I tried all the ways I could think of on the mockup. I focused on a spontaneous technique for the user to easily open and close the container. For this concept, I have a flap for each top leaf that can hock to a side slot in each side of the container. However, the top leaves needed more support, and the slot holding force was not enough to get them horizontal and strong for sturdiness purposes.
In another concept, I used a different way to slot like a dowel for each side in order to elongate the weight of the top leaf on all sides of the container. This solution was fine for holding but created gaps on the side of the container. I tried to think about this in a new way.

My final thought was making the top leaves the same size so they can sit on top of metal brackets that can hold the weight and strengthen the connection between the container and the top leaves. When closing, the tops will sit on a pig connection from inside for easier usage.
Sketches
2. Studying the storage area

The storage area and the connection between the leaves.

I had many questions in my mind about this empty space between the two tops. Should I close it? I tried to come up with a simple solution for this question, but after consulting my advisors, I decided to leave it without closing the space and let the user decide how they want to use it. As I mentioned before, I want the user to feel an emotional connection toward the table. That's why I made it a free and creative space to fill in with different stuff that each user desires. Also, I decided to have a bridge between the two tops by using a more interesting connection.

Sketches
How can I use storage containers inside the table?

In the beginning, I started with the thought of filling all the space inside with a pack of containers for the user to fill in with dining ware as you see in the picture. But I remembered my first intention and inspiration that a dining table is a center of any residential area. My goal was not to limit the user’s thinking but just the opposite, which is leaving the user to use this space as he wants. As a result, I decided to go with one container that comes with the whole package.

Sketches
3. Studying the legs angle.

The angle of the legs and how the legs will attach to the container.

The angle of the legs of the table and their direction were a very big issue for me. I tried different angles, positions, and directions, and analyzed each one of them to see which would answer my concerns. After many trials, I chose a slight 8-degree angle that directed to the side rather than the corners to make the table’s overall space smaller. That also serves as a simpler solution for the joints to be in.

**Sketches**
4. The nesting.

How to nest all the parts inside?

Limiting the parts and having a system for them was one of my goals. My concept is to nest all the table parts, which consist of two tops, two benches, table legs, bench legs, the holder/brackets, and a container inside the whole container. By trying many different positions of organizing the inside parts, I achieved a perfect nesting position for each part of the table.

5. The wheels option.

Considering wheels for easier transportation was an option. I tried it on the mockup, but I did not find the solution very effective or practical for usage. By sticking two wheels on one side of the container and having a rope for holding on the other side, I figured out that it is easy for moving, but it is a hassle for the user to detach them and then store them for a future move.

Sketches
6. The joint

For assembling the container, I started thinking about different methods of wooden joints. My first mockup was a wooden connection, yet I discovered that it is not the way my concept was going. From the whole container being plastic, I was looking for a corner joint for each corner to connect the container sides. I brainstormed many different ways of joint connection, and I used 3D printing technology to test my ideas. With each concept, I tested a different problem. For instance, I designed the joint in the beginning for corner legs, which lately I realized has a tremendous footprint that it would take up on the ground. By changing the angle factor, I reached a solution that was the simplest and most feasible.

3d printed mockups
Sketches

I have to decide which way I compile from 2 weeks ago.
User Testing

Some testing experiences involved my classmates. From their comments: the size of the table was not big enough, and they wondered about the space in the middle, which I explained to them later.
Prototyping

The pictures below show the prototyping stage and the different technologies I used to create my final prototype. This stage took about 45 days to complete. I have used 3D printing technology to create the joints for both the chairs and the dining table. Gladly, my seventh printed design for the joints became the final designs for my table. In addition, I have used the CNC machine to carve the wood pieces creating the final components of the table. During this stage, I made a carving on the topsides of the table top/cover to ease the process of opening the container.

After creating the different parts, I used different hardware tools and bolts and washers to assemble the final prototype. Also, the final touches related to finishing the table involved using spray paint and natural wood finishing oil.

Technologies and tools used:

- 3D printing
- CNC cutting machine
- Hardware tools
- Spray paint
- Different shop tools
Chapter V

Final Design

Final Design
Components and Features
Potential Scenarios
Final Prototype
Drawings
Final Renderings
Testing
Final design
A furniture collection designed for young nomads. **RAHHAL** can be easily assembled and disassembled. When packed, it can be moved conveniently from one place to another. **RAHHAL** makes it easier for the user to continue their nomadic journey around the world with different cultural flavors.

**RAHHAL**
All the parts nest inside the middle container in a smooth way. In a very intuitive method, the user opens the package and starts assembling the table for usage. And for moving again, the user can disassemble the table and put it back together in the package and then **RAHHAL** is ready to go.
Components and Features

RAHHAL has many features that make the user’s life much easier and simpler. It has a compact shape and a lightweight wood for easy carrying and portability.

It has white latching straps for sealing the container and for carrying the table container around. Straps can be stored inside the container after opening.
All the RAHHAL parts inside the table package compose 21 particular elements:

- 2 top leaves
- 4 table legs
- 2 benches
- 8 bench legs
- 4 holding-metal-brackets
- 1 Tupperware

All the parts nested inside the container
The user can start assembling the all the parts. The two top leaves sit on four metal brackets that are designed especially for holding the wooden tops. From the opposite side of the top leaves, there are two small circular pigs for holding the tops in place.
Potential Scenarios

The cultural aspect
From my research, I was fascinated by different cultures and how they pursue the dining experience. I incorporated this aspect in my design with a smart legs feature, which is exchanging the legs of the table with the benches or even without legs at all.

There are three seating states:
- State 1: Using the table at a Western style height by using the full table length legs.
- State 2: Using the table as a coffee table length by exchanging the table legs with the bench legs so the benches stay on the ground.
- State 3: Using the table as a low ground length by removing all the legs and putting the benches on the ground.
Potential Scenarios

STATE 1
Regular level

STATE 2
Coffee table level

STATE 3
Ground level
Potential Scenarios

The emotional aspect

The use of materials and colors, the simple design, and the wood in particular serve the purpose of absorbing all the user’s daily life activities. With scratches and dents, the table will keep special memories for users over their lifetime. RAHHAL provides the freedom for users to use the furniture as they want, whatever their lifestyle is. This was a monumental decision for the design that makes the table fit into the user’s life perfectly.
Different life activities
Different life activities
Final Prototype
Drawings

The table 41.7” x 40” x 35.6”

The bench 30.5” x 8” x 25.7”
Drawings

Storage volume 40” x 13.7” x 4.5” = 2466 inch$^3$

The container 11” x 6” x 4”
Final Renderings
For more personalization and customization, the joints come in different colors that can match with their different tastes and styles.
Testing

http://www.aishaiskanderani.com/thesis-progress/final-model-testing

The steps

1. Open the packaged table by removing the tops.
2. Remove the parts from the inside of the container.

3. Put the table on the side positions.
4. Mount the legs of the table.

5. Flip the table on the right positions.
6. Attach the metal brackets.

7. Slide the tops in place.
8. Mount the benches by attaching the legs.

9. You are done.
From the testing
In my last testing for the final design, it takes five minutes to open and put together all the parts, and three minutes and twenty seconds to disassemble and pack up the table for transport or storage. This will make the task easier and simpler for the user to congregate and disperse the table and repeat this whenever they need to. **RAHHAL** weighs about 28.66 pounds (13 kilograms), which is average for handling and moving around a furniture product.
Chapter VI

Summary and Conclusion

Opportunities
Future Developments
Conclusion
Opportunities

After the preparation for this thesis presentation and my show, I received tremendous amounts of valuable opinions and comments from my colleagues, advisors, and the general public. One of the most interesting comments was opening different market avenues for RAHHAL such as outdoor market, picnics, and outside the residential market. My target user in my research was the young generation who lives in small spaces. However, I discovered that my design and concept also fit the outdoor market because of its usability and portability that make it an excellent choice for outdoor enthusiasts. Some commentators also suggested using different colors and materials as I have mentioned before.

I was also thinking about the Do-It-Yourself (DIY) market with various options for it. For example, the joints could be sold with an instructional video and guide, then the customer can choose the color of the joints, and then he can do his own cutting work. The customer can choose a specific kind of wood that he wants and do the finishing in his own style.

In my thesis project plan, I considered designing a product line that starts with the dining table, a closet, and organizing containers. I started with the closet concept and design and made some initial mockups. Then I just focused on the table design with all its details. As a result, my future plan is completing a whole set up with multiple products such as a lighting unit, tableware, fabric home accessories, rugs, and living room furniture.
Future Developments

Nesting changes
Studying different possibilities of the nesting process. Having different options for organizing the parts inside the container.

Product line
Completing the product line. I considered designing a product line that starts with the dining table, a closet, and organizing containers, but I just focused on the table design with all its details. As a result, my future plans completing a whole set up with multiple products such as a lighting unit, tableware, fabric home accessories, rugs, and living room furniture.

The second life
Developing a recycling system for the products. How the products could adopt a second life recycling system. Researching about different materials and the possibility of using recycled materials or thermoplastic materials for the product’s joints.

Joint variations
Developing different joint systems and variations. I still have some developments on the joint designs to make them sturdier for longer life.

User experience
Studying the user experience by testing the product’s features. Recording and observing the users’ reactions while interacting with the product and seeking possible methods to improve the experience.
Conclusion
After spending a year on my thesis journey making the RAHHAL dining table, I crossed upon many issues, stories, experiences, people, and surprises. During the first semester, which was Fall 2014, I started with an ambiguous plan but then turned it around and developed clearer goals. I learned a lot from each step I went through in my process.

Regarding the user experience and through my design, I have achieved my goal of putting the user as the center of my design. That was achieved through questioning myself about every detail and step related to the user. I considered every thought and comment I received from every person and especially from my advisors.

Nowadays, globalization has affected every aspect of different cultures and lifestyles. RAHHAL was designed as a product that provides a customizable experience to users to match their culture and their lifestyle. RAHHAL is a durable product that can be easily moved from one apartment to another without worrying about the pain of complicated assembly and disassembly. As a result, less furniture will be discarded for the reason of difficulty in transporting it from one location to another. This serves to reduce waste and become a greener community.

I can see the RAHHAL concept being spread to create many different products. The RAHHAL concept can provide users with an easy life with less waste, and it enables users to carry their emotional attachments with them wherever they move. Nomad or not, RAHHAL will be an advantage to have.
Bibliography


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