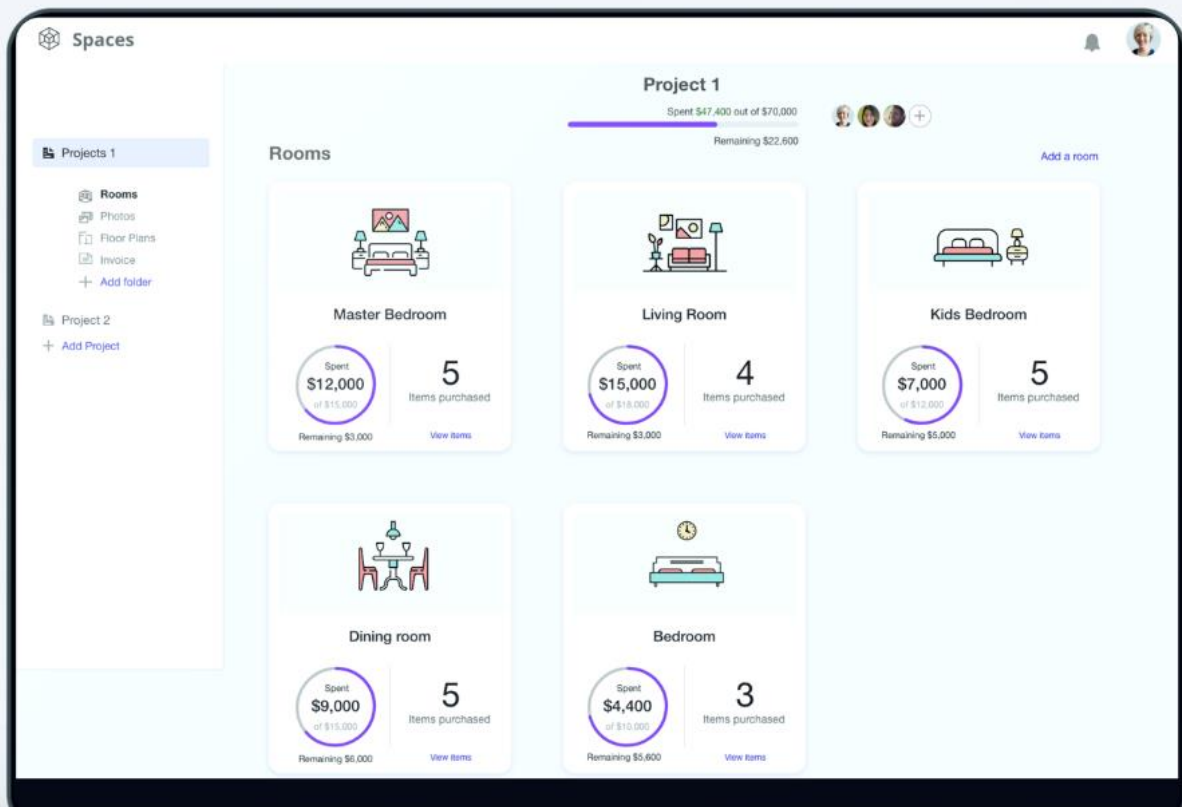


# Streamlining the Shopping Experience

A Project Management Application Design  
for Furniture Shoppers

By  
Chandni Luhadiya



**Streamlining the Shopping Experience:**  
A Project Management Application Design for Furniture Shoppers

By  
Chandni Luhadiya

A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Design

in

Industrial Design

Department of Art and Design  
University of Alberta

© Chandni Luhadiya, 2020

# Table of Contents

<b>ACKNOWLEDGMENT</b> .....	<b>1</b>
<b>INTRODUCTION</b> .....	<b>2</b>
<b>CHAPTER 1 SECONDARY RESEARCH</b> .....	<b>3</b>
<b>1.1 BACKGROUND</b> .....	<b>3</b>
<b>1.2 CONSUMERS BUYING BEHAVIOR FOR HOME FURNITURE</b> .....	<b>4</b>
<b>1.2.1 Shoppers' micro-moments</b> .....	<b>5</b>
<b>1.2.2 Shoppers' buying behavior across multiple channels</b> .....	<b>5</b>
<b>1.3 WHAT COMPANIES ARE DOING TO MEET THE DEMAND OF MODERN-DAY CONSUMERS?</b> .....	<b>8</b>
<b>1.3.1 Omni Channel strategies by companies</b> .....	<b>9</b>
<b>1.3.2 Technologies in Furniture shopping</b> .....	<b>10</b>
<b>1.3.3 Competitive analysis</b> .....	<b>17</b>
<b>CHAPTER 2 PRIMARY RESEARCH</b> .....	<b>20</b>
<b>2.1 USER INTERVIEWS</b> .....	<b>20</b>
<b>2.2 ETHNOGRAPHIC RESEARCH</b> .....	<b>21</b>
<b>2.3 SYNTHESIZING RESEARCH: EMPATHY MAP</b> .....	<b>21</b>
<b>2.4 SURVEY</b> .....	<b>22</b>
<b>2.5 SYNTHESIZING RESEARCH: AFFINITY DIAGRAM</b> .....	<b>23</b>
<b>2.6 USER PERSONA</b> .....	<b>25</b>
<b>2.7 JOURNEY MAP</b> .....	<b>27</b>
<b>2.8 INSIGHTS</b> .....	<b>28</b>
<b>CHAPTER 3 DESIGNING SOLUTIONS</b> .....	<b>28</b>
<b>3.1 USER GOALS</b> .....	<b>28</b>
<b>3.2 DESIGN INSPIRATION</b> .....	<b>29</b>
<b>3.3 BRAINSTORMING</b> .....	<b>30</b>
<b>3.4 ASSUMPTIONS, LIMITATIONS AND TRADE-OFFS</b> .....	<b>31</b>
<b>3.5 STORY BOARD</b> .....	<b>31</b>
<b>3.6 WEB APP DESIGN</b> .....	<b>33</b>
<b>3.6.1 User Flow</b> .....	<b>33</b>
<b>3.6.2 Conceptualization</b> .....	<b>34</b>
<b>3.6.3 Style Guide (Figure 3-13)</b> .....	<b>41</b>
<b>CHAPTER 4 HIGH FIDELITY PROTOTYPE</b> .....	<b>42</b>
<b>4.1 WEB APP</b> .....	<b>42</b>
<b>4.2 MOBILE APP DESIGN</b> .....	<b>72</b>
<b>CHAPTER 5 CONCLUSION</b> .....	<b>76</b>
<b>5.1 SUMMARY</b> .....	<b>76</b>
<b>5.2 FUTURE THINKING</b> .....	<b>77</b>
<b>CHAPTER 6 BIBLIOGRAPHY</b> .....	<b>79</b>
<b>CHAPTER 7 REFERENCES</b> .....	<b>85</b>
<b>CHAPTER 8 APPENDICES</b> .....	<b>88</b>
<b>8.1 ETHICS APPLICATION</b> .....	<b>88</b>
<b>8.2 POSTERS AND EXHIBITION</b> .....	<b>110</b>

## **Acknowledgment**

I would like to express the deepest appreciation to my thesis supervisor, Robert Lederer, for his immense support at every stage of my thesis project. His friendly guidance and words of encouragement have been invaluable throughout my master's degree. Without his guidance and persistent help, this thesis would never have been completed. I am grateful to him for everything and I am blessed to have got the chance to work with him.

I am very thankful to the Department of Art and Design at the University of Alberta, which offered me this great opportunity to pursue my interest in design. I would also like to thank my first-year professors – Robert Lederer, Gavin Renwick, Tim Antoniuk, and Aidan Rowe for their support and guidance.

I would also like to show gratitude to my defense committee members: Aidan Rowe, Greig Rasmussen, and Arlene Oak for their precious time. Also, a great appreciation for the research participants for sharing their knowledge with me.

Completing the thesis project, especially during COVID-19 times requires more than academic support. I am grateful to my family and friends who have never stopped motivating me. Their endless support is what helped me put my best effort into my project.

## **Introduction**

Shopping is one of the most common and frequent activities in everyone's life. There are a plethora of ways to shop using multiple channels either in-store or online. E-commerce has demonstrated an increased growth in the retail market, amounting to a 16% share of the total retail sales in 2019, up from 14.4% in 2018 [1]. Also, in 2020, COVID 19 has exponentially increased online shopping. The growth of online shopping has represented a significant change in consumer shopping behavior. An increased number of people now prefer to shop online rather than in brick and mortar for numerous reasons. The ability to shop 24/7, to compare prices, to save time, the convenience of not physically visiting a shop, increased variety, more selections, to avoid crowds are but a few of the reasons for this activity. However, in the case of home furniture and interior design, consumers still prefer to visit multiple brick and mortar stores to see, touch, feel and try out items before making a final purchase either at the store or back online. When it comes to designing their homes, people often move between digital and physical browsing channels [2]. Any bad decision made in any of these channels leads to a bad overall shopping experience.

Buyer's remorse is one of the most common emotions associated with furniture shopping, as furniture shopping is an expensive and time-consuming process. People often become anxious after purchasing inappropriate and expensive furniture for their homes. When people make inappropriate purchases, they either compromise or tend to return the products. The "2019 Consumer Returns in the Retail Industry" report states that the sum of returned products in the United States in 2018 was \$309 billion [3]. Returns are stressful for retailers as they have to pay high costs to process returns in terms of staff and resources. Also, the products returned or exchanged are usually damaged and cannot be easily resold. In order to cover the losses, manufacturers, and retailers increase the price of the products including furniture. This creates a loop between customers and retailers as due to the wrong purchase of expensive products, they return the product and retailers increase the prices to balance the losses. This emphasizes the need to enhance the furniture shopping experience and increase customer satisfaction which would also, in turn, reduce furniture returns in the retail industry.

A typical furniture shopping journey has multiple stages. The purpose of this research is to identify the needs, goals of consumers, and the issues they face in their furniture shopping journey. Connecting the dots between each stage of their shopping journey, this thesis hopes to design a seamless experience. Throughout this project, I have followed 5 steps of the design thinking process developed by the Hasso-Plattner Institute of Design at Stanford (d. school) [4]. The five steps are Research, Define, Ideate, Prototype, and test.

## **Chapter 1 Secondary Research**

### **1.1 Background**

In the past two decades, E-Commerce has revolutionized retail industries. It has demonstrated an increased growth in the retail market, amounting to a 16% share of the total retail sales in 2019, up from 14.4% in 2018 [1]. However, the total value of returned products in the United States in 2018 was \$309 billion, and online shopping returns accounted for \$41 billion [3]. Moreover, 50% of the returned products were expensive products and furniture comes under this category [5].

Returns have become the new normal for shoppers. 62% of the shoppers would buy again from a company that offers free returns for their products [6]. Due to this consumer shopping behavior, the majority of retailers are making free returns and shipping to make profits while increasing the prices of the products. Retailers are increasing the space of their inventory and hiring more workers to handle returned products. Some of the brands also offer flat shipping fees which means no matter how large the order is, the shipping fee remains constant. Moreover, some companies have a 7-day return period, and some companies like Ikea offer a 365-day return policy. People can use the furniture in their space and can return it within a year to receive a full refund [7].

Consumers take huge advantage of this free shipping, exchange, and flat-rate policy provided by retail companies. There are various reasons why people return products such as substandard quality, inappropriate color, or wrong size. However, according to data from Narvar, 41% of people buy multiple products with the intention of returning [8]. Some people try to replicate the

experience they get in brick and mortar stores by ordering multiple sizes and color of a product, pick the one that suits their needs and return the rest [8]. Some people face difficulties in visualizing how a product will look in combination with other products they have and therefore they buy multiple products and return the ones they do not like. This results in major losses to retailers. Retailers have to pay for receiving, sorting, and repackaging of usable goods for reselling the returned products. Moreover, they have to handle the expenses of merchandise that cannot be resold. Due to this, some retailers adjust the prices of the products to maintain business margins and some incur huge losses.

## 1.2 Consumers buying behavior for home furniture

Houzz, which is a leading online platform for home designing and remodeling, surveyed in 2017 and gathered information from close to 107,000 registered users of Houzz. According to its research report, homeowners are increasingly spending on home renovation and interior design [9]. Moreover, they found out that homeowners usually take a year to finish a home renovation project (Figure 1-1).

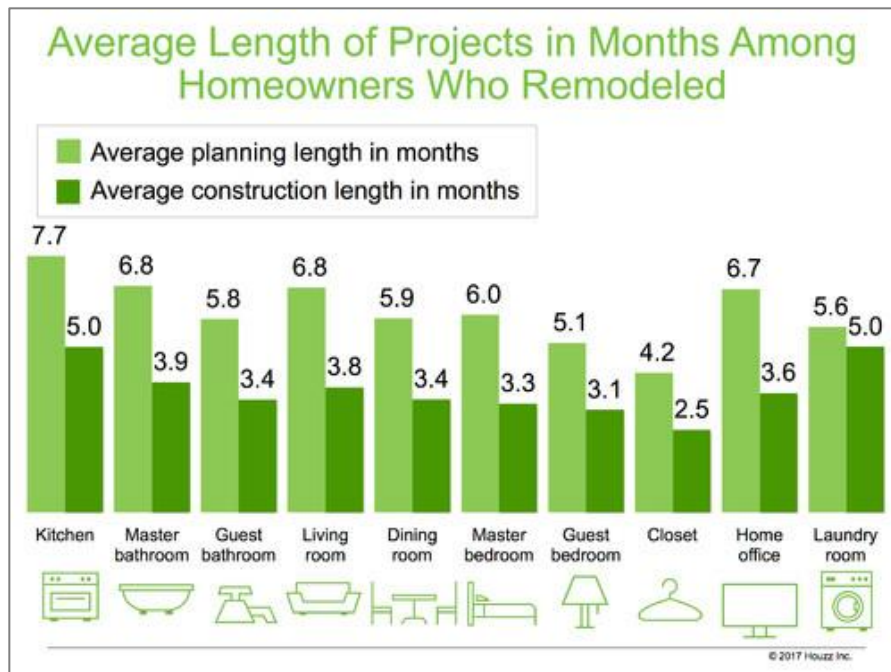


Figure 1-1 Average length of projects (Image by Houzz, Inc. 2017)

### 1.2.1 Shoppers' micro-moments

According to research done by Think with Google, every shopper goes through 4 shopping micro-moments, however, the type varies with each retail category [10]. When designing or decorating the house, customers go through the following micro-moments:

**“I need some ideas” moments:** During this time, customers do extensive online research and browse multiple stores to touch and feel the furniture. Think with Google states that customers rely heavily on online browsing to get inspiration and knowledge.

**“What is best for my space” moments:** In this phase, shoppers fine-tune their style preference by browsing multiple styles suitable for their space from different brands. Image search is the most common activity performed by shoppers during this time.

**“Am I getting the best value” moments:** Shoppers are highly influenced by deals and discounts offered by retailers. They spend significant time to compare prices and decide on a budget to make sure they are getting the best deal.

**“I want to buy it” moments:** In this stage, people either shop online or through the store. Shopping activity in today's modern world does not end when the mall closes. An increasing number of people prefer to shop online whether through web or mobile. Even if people prefer to visit stores to touch and feel furniture, they do not hesitate to purchase online once they finally make their selections [10].

**To create products that could best serve customers, it is important to address the issues or requirements customers have during the above shopping moments.**

### 1.2.2 Shoppers' buying behavior across multiple channels

Channels are the numerous ways that shoppers can access information online or in-person by visiting retail outlets. According to the Pew Research Center, 65% of online shoppers still prefer to go to brick and mortar stores for multiple reasons [11]. This was also mentioned by Time Trade's survey that in-store promotions and sales associates, who assist customers in choosing designs, were pointed out as the top reasons for physical store visits [12]. Tech-savvy people use



mobile devices in stores to support their shopping experience. A number of years back, the use of mobile devices in traditional shopping (in-store) was limited to taking photos or calling a friend for advice. Nowadays, consumers are also using mobile devices to browse prices, to find alternate options of products, and to write notes for future reference. Studies have proven that the use of mobile devices in stores distracts people from the point of purchase products that retailers intentionally keep at checkouts and other places to attract customers. “Mobile Blinders” is the term used when people get completely involved in their mobile devices while shopping, during checkout, or other places [13]. These people get so engrossed in their devices, that they don’t notice things around them especially during checkouts and they don’t pay much attention to the impulse display racks at supermarkets or retail stores.

Retailers who utilize this habit of customers can divert them from their traditional shopping loop. In the home furniture retail industry, mobile phone usage in-store can allow customers to view multiple options available for the same product in-store. Also, it can allow people to compare different products more easily.

Today’s shoppers are much more informed about the products they are looking to purchase as they have access to detailed information about companies, products, and product reviews online, which educates them about products before making any purchase. If shoppers want to have their designs reviewed by in-store design consultants, these consultants need to be highly educated about products in order to respond to shopper’s needs.

Even though there are numerous product choices available in the market place and several ways to shop, a large number of people face buyer’s remorse. Psychologist, Barry Schwartz points out that it is a myth that large number of choices in product selection are better. Too many choices lower satisfaction because it increases time and effort in selecting furniture, and produces high expectations and anxiety [14].

Literature on multichannel marketing shows that consumers who shop using multiple channels are more satisfied than shoppers who use only one channel [15]. With multiple channels available, consumers either pursue showrooming, which is browsing in-store and purchasing

online, or webrooming, which is browsing online and purchasing in store [16]. According to Nicole Ponder, 76% of people prefer to visit multiple stores before they choose furniture. They are willing to spend a considerable amount of time to find a piece of furniture that best suits their space and also within their budget [17]. Research conducted by Furniture World shows that around 90% of furniture purchases made by shoppers are planned (Figure 1-2). 9/10 people like to do extensive research before finalizing [18].

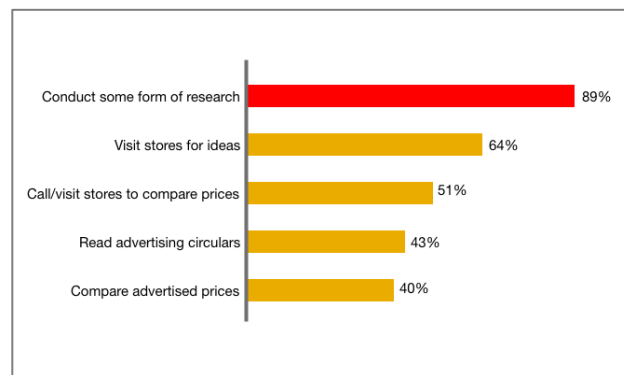


Figure 1-2. Consumer preparation process for purchasing furniture (Data from Furniture World magazine)

If consumers spend time, effort, and do their homework judiciously in selecting furniture and if proper tools are available to them to compare and visualize furniture from multiple stores, then chances of buyer's remorse can be diminished. This can also greatly help in reducing returns of furniture, which would be beneficial for both customers and retailers.

When designing homes, people often move between digital and physical browsing channels which take a lot of time to plan. They research online and visit stores to gather ideas or compare products in terms of style and prices. According to the research report by "Furniture World", on an average basis, a person buys furniture once in 4 years and so they tend to do a thorough study before purchasing. Another important factor is that people browse multiple websites online to gather inspiration and visit an average of 3.2 stores before purchasing [18]. Customers usually do not buy everything from one store (Figure1-3).

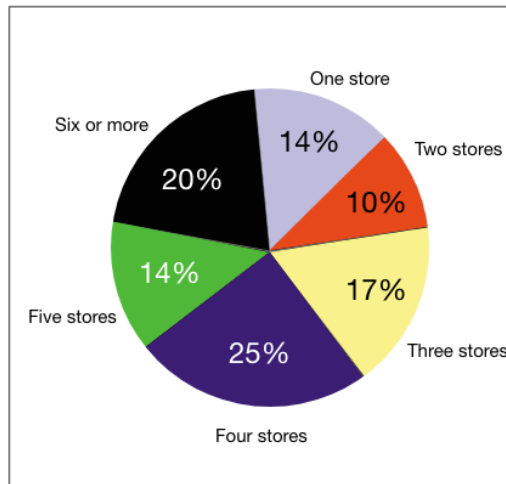


Figure 1-3. Number of stores visited by furniture shoppers before finalizing furniture (Data by Furniture world)

**To summarize, consumers purchase from multiple stores and spend a lot of time to try to visualize and compare furniture from various stores which can also fit their budget. Therefore, it is crucial for shoppers to have access to appropriate tools that can help them ease their planning process before making a purchase.**

### **1.3 What companies are doing to meet the demand of modern-day consumers?**

Shopping has evolved from single channels to multiple channels. As customers prefer to shop using multiple channels and devices, it has become crucial to leverage these interactions to satisfy their needs. Lately, the focus of retailers has been on a Multi-channel approach to sales. Now with increased customer expectations from brands, it has become vital for retailers to provide omnichannel experiences to the customers. When customers have a unique experience between all brand touchpoints (in-store, website, mobile app, social media, etc.), it is called a multi-channel experience. Omnichannel experience is creating a unified and uninterrupted experience between all the different channels or points of interactions between customers and retail brands [19]. When shoppers move from one device (e.g. mobile) to another device (e.g. laptop), they should be able to resume from where they left previously rather than starting it all over again. To effectively adapt to an omnichannel strategy in business, retailers should provide

a unified user experience across websites, mobile apps, social media, in-store, messaging, and many more.

### 1.3.1 Omni Channel strategies by companies

Several brands have adopted omnichannel strategies. Not all brands deal with furniture shopping, but, insights can be learned from their experience. Disney is a good example of a company that has adopted this experience extensively. The experience begins with its mobile responsive website to book the trip. Once the trip is booked, the Disney web and mobile app can be used to plan the entire trip to Disney, right from selecting restaurants to getting a fast pass for rides. In the park, the mobile app allows a person to locate the attractions as well as to find out the wait time for rides. Disney's Magic Band acts as a hotel room key, photo storage device, and food ordering tool. It also has fast pass integration which can be used when you can't use a mobile app (due to various reasons like no network, no battery, etc.). All these channels provide a holistic experience to Disney's customers (Figure 1-4).

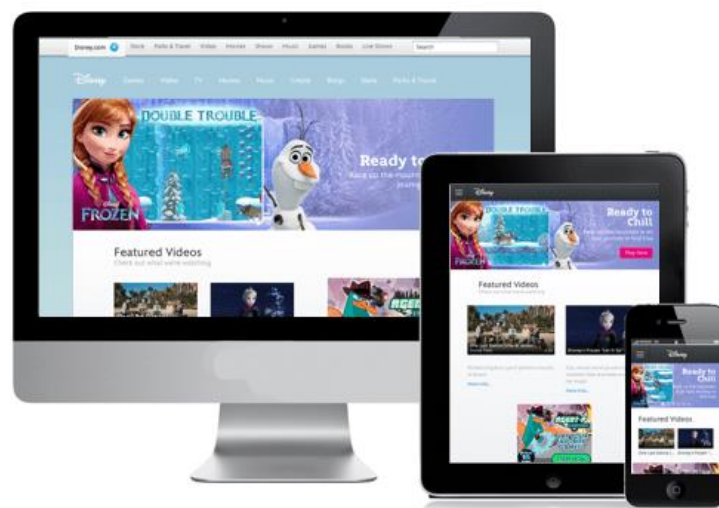


Figure 1-4. Disney's omnichannel experience on desktop, tablet and mobile. (Image by Hubspot)

Source: <https://blog.hubspot.com/service/omni-channel-experience>

In the furniture sector, Ikea is one of the companies using omnichannel methodologies. Ikea tries to incorporate seamless experiences by creating a mobile app that can help users browse effectively in-store. The app is made to make the in-store experience smooth. People can browse

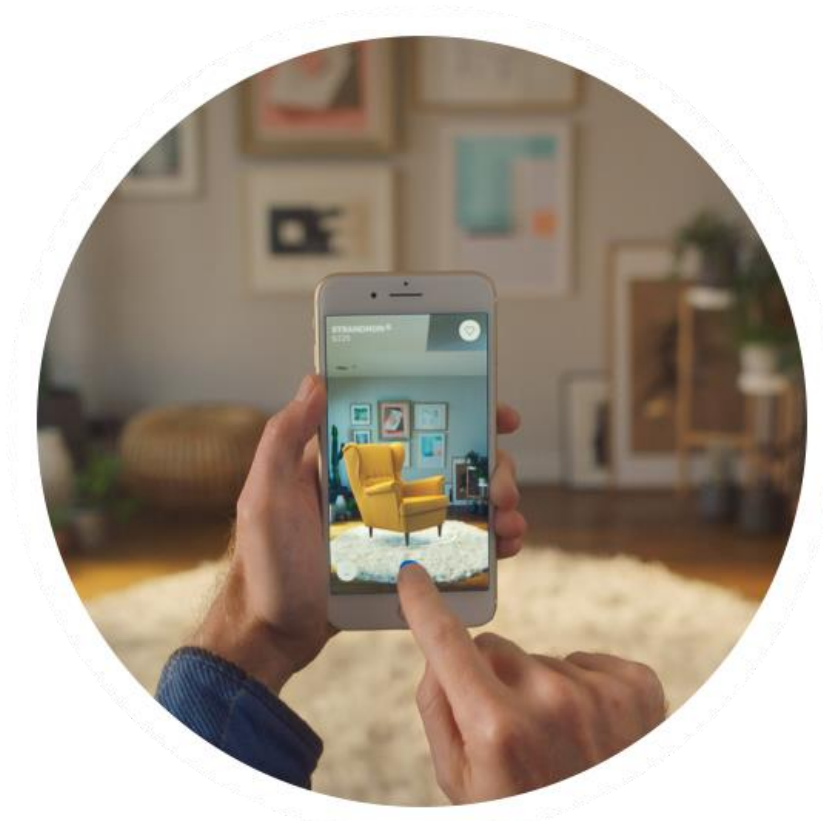
online at home and make a shopping list in the app itself. While visiting the store, they can use the shopping list to continue the research, they can also scan products to add to their shopping list, and can go ahead to self-checkout to purchase products. People can also create an account online and can use any of the computer systems in Ikea to develop 3D models of their space with the help of design assistants. They can resume working on the same 3D model in their mobile app or any other device which supports the file format.

Customers' expectations in visiting a store have become more than just going there to buy products. Shoppers now demand an experience from the stores [20]. Retailers are trying to incorporate both omnichannel strategy and experiential design in their customer experience goals. The use of mobile apps in the store has been observed and the retailers are attempting to make their online and in-store experience seamless using the mobile app. Nike is one of the first companies that has adopted an omnichannel and experiential design strategies for its flagship store in New York [21]. It allows people to use Nike's mobile app in-store and to experience Nike's products in a variety of ways. The ability to customize the products and the option to chat with the designers are some of the customer experience related features. This strategy has been adopted by home furniture retail stores such as Restoration Hardware (RH). RH has developed experiential stores and in-store restaurants that allow people to dine-in at the store itself and use the furniture in a way they would use at their homes [22]. They have also added a variety of features on their website which support this experience. One of the features is the ability for customers to add furniture to the virtual cart online (on the website) and being able to directly open the virtual cart in the store for purchase.

### **1.3.2 Technologies in Furniture shopping**

With the shifting behavior of customers from a single-channel to multi-channel to omnichannel platforms, companies are experimenting with various tools to keep consumers engaged with their brand. They are leveraging technologies such as Augmented Reality (AR) to provide a personalized experience to shoppers and to simplify their decision making. AR is a technology that overlays information on top of the digital representation of the user's own physical environment [23]. Sephora's Augmented Reality E-commerce experience provides an immersive

experience to shoppers as they can try makeup products on a digital representation of themselves before purchasing [24]. Similarly, in the home furniture industry, the “Ikea Place” app is using augmented reality to allow people to see the products in a digital representation of their own space before purchasing it (Figure 1-5). This allows users to see the products in their own space and visualize it before buying expensive furniture [25].



*Figure 1-5. Ikea Place AR app (Image by Ikea)*

Source: [https://www.ikea.com/ms/en\\_JP/this-is-ikea/ikea-highlights/2017/ikea-place-app/index.html](https://www.ikea.com/ms/en_JP/this-is-ikea/ikea-highlights/2017/ikea-place-app/index.html)



*Figure 1-6. Natuzzi's Augmented store for VR shopping (Image by Dezeen)*

Source: <https://www.dezeen.com/2019/08/05/natuzzi-augmented-store-virtual-reality-interiors-retail/>

Companies are also setting up VR booths in stores that allow consumers to see their furniture selections in their own space. Natuzzi, an Italian furniture brand, has launched a Virtual Reality (VR) shopping experience [26]. The brand's store lets shoppers enter a digital rendering of their own home in VR and decorate it with Natuzzi's furniture (Figure 1-6). Customers wear Microsoft's HoloLens headset to interact with the home-like space in a digital environment, move products around, change patterns, or colours. (Figure 1-7).



*Figure 1-7. Natuzzi's Augmented store for VR shopping (Image by Dezeen)*

Source: <https://www.dezeen.com/2019/08/05/natuzzi-augmented-store-virtual-reality-interiors-retail/>

To enhance the in-store experience many retailers are increasingly investing in hiring interior designers as design consultants who can educate walk-in customers about their products and help clear up doubts they might have. Design consultants suggest products to shoppers according to their space and requirements.

Some furniture retailers are also using 3D configurator apps in the store which allows buyers to see all possible variations of a product in one place digitally without going through a lot of different images [27]. Shoppers can drag and drop colors or can customize the furniture themselves. The configurator easily shows the price to the shopper as per customization which reduces the work of salespeople and gives more independence to shoppers (Figure 1-8).



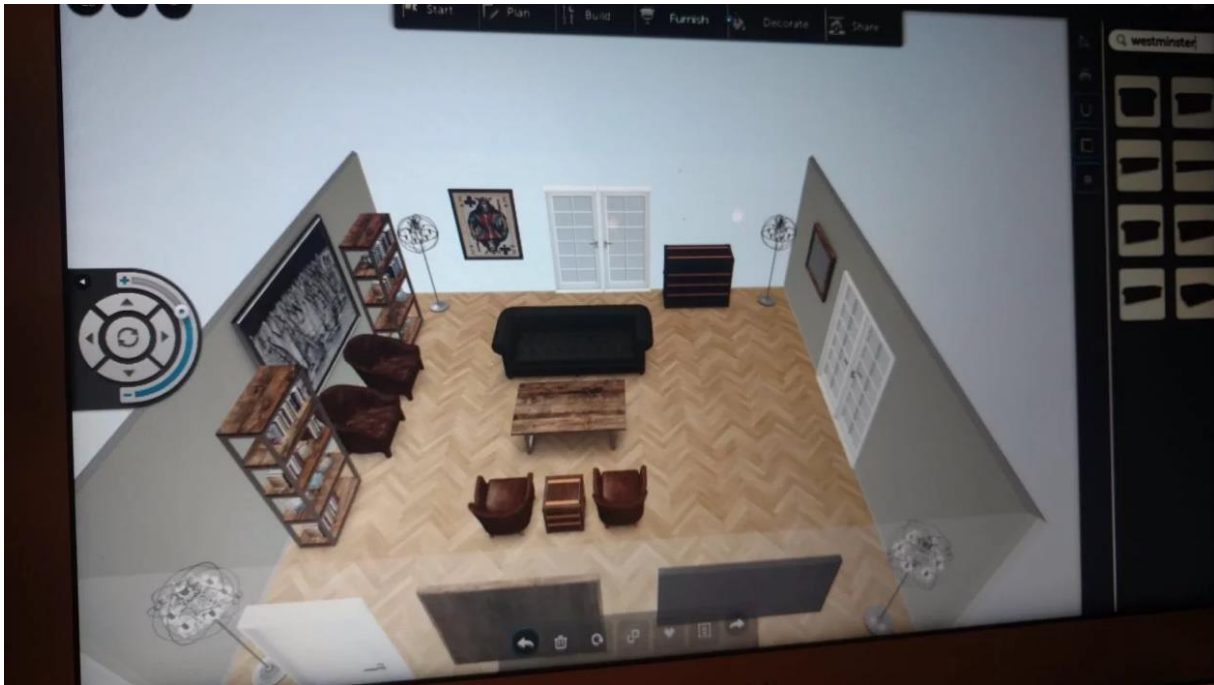


Figure 1-8. 3D furniture configuration app at IMM 2018

Source: <https://blog.vakoms.com/imm-2018-technology-trends-in-furniture-industry/>

2D floor plans are difficult to understand and visualize for non-designers. 3D models make it easy for the clients to visualize their space and understand the size & style they require for furniture (Figure 1-9).

Because of this, some retailers also use space planning apps that can help convert 2D blueprints of the house into 3D models to give a realistic impression of how the whole room or house will look [27]. The company can then add their own 3D products in the space to show how furniture will look in the client's own space.



*Figure 1-9.3D space planner app at IMM 2018*

Source: <https://blog.vakoms.com/imm-2018-technology-trends-in-furniture-industry/>

Furniture brands show various colors of a single product on their website. This allows shoppers to choose from various colors and visualize furniture in their space.

To help them visualize how a particular furniture product for example a bed will look with a nightstand, they show entire room images. This helps customers understand the overall look of the space and also acts as an inspiration for their own space.

E-commerce stores such as Wayfair allow customers to browse furniture from thousands of stores. They also have room ideas in which customers can select the products to purchase directly from the room settings by clicking on the tag icon placed on each furniture item. This helps customers to visualize how particular furniture will look with the rest of the furniture provided in a Wayfair room catalog (Figure 1-10).



*Figure 1-10. Wayfair Room Ideas (Image from Wayfair)*

Source: <https://www.wayfair.ca/shop-the-look/sl0>

Target also uses various ways to help customers visualize its furniture in the space and make them more confident about shopping. They came up with 360-degree shoppable rooms that allow customers to view the room from all angles in just one image using a dragging option. This again is an approach designed to make customers more confident about purchasing a product (Figure 1-11).

### 360 Degree Shoppable Rooms

Target / Home / 360 Degree Shoppable Rooms

Explore our virtual 360° rooms

Discover new pieces & see how they come together

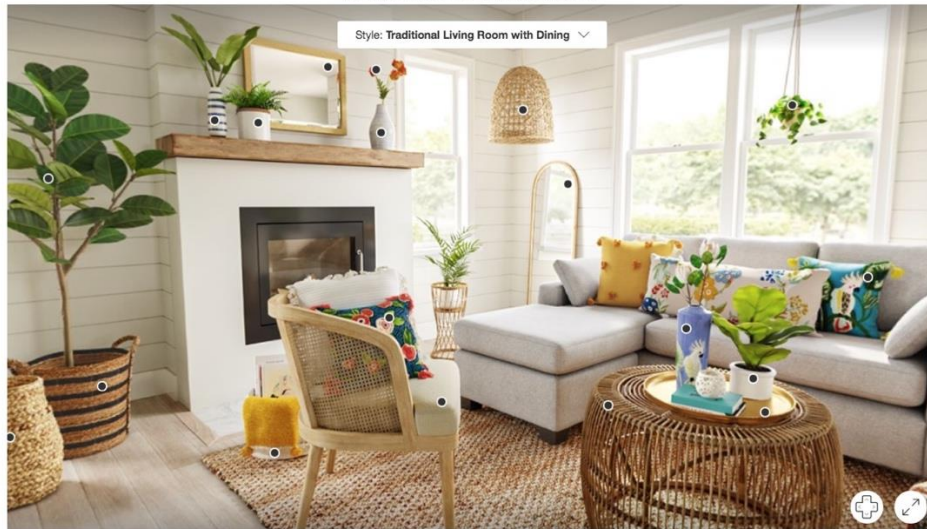


Figure 1-11. 360 degree shoppable rooms (Image from Target)

Source: <https://www.target.com/c/360-degree-shoppable-rooms/-/N-mng3h?Nao=0>

Furniture companies are aware of shoppers' omnichannel buying behavior. They know that shoppers do extensive browsing online before visiting a store and the majority of shoppers purchase online. To support this behavior, they are also investing in enhancing the e-commerce checkout experience. The checkout experience includes various features on their websites such as automated inventory updating, coupon creator, and chatbots or live chats.

Amazon, Target, Wayfair, Ikea, and many more furniture shopping brands are exploring emerging technologies to make shoppers more confident while buying. 3D modeling, augmented reality, virtual reality and various other technologies are continuously being explored to increase customer satisfaction and to reduce returns.

### 1.3.3 Competitive analysis

I conducted a competitive analysis to understand what brands are currently doing to enhance the shopping experience. This analysis was done to better understand the opportunity areas to further explore. (Figure 1-12)






	Visualization with other products	Compare multiple stores	Organizer and Budget tracker	Collaboration and share	Browsing
 Pepper Fry	✗	✗	✗	✓ Sharing with others ✗ No design with collaboration	✓ Has wishlist for future use ✗ No feature to save images saw in store.
 Home-Design & decor shopping	✗	✓	✗	✓ Sharing with others ✗ No design with collaboration	✓ Has wishlist for future use ✗ No feature to save images saw in store.
 Wayfair-Shop all things home	✗	✗	✓ Organizer ✗ No budget tracker	✓ Sharing with others ✗ No design with collaboration	✓ Has wishlist for future use ✓ Barcode scan to save images saw in store.
 Ikea	✓	✗	✗	✓	✓ Has wishlist for future use ✓ Barcode scan to save images saw in store.
 Overstock Furniture and decor	✓	✓	✗	✓ Sharing with others ✗ No design with collaboration	✓ Has wishlist for future use ✗ No feature to save images saw in store.

Figure 1-12. Created competitive analysis to identify opportunity areas

When comparing what shoppers need from section 1.2 and what companies are offering from the above competitive analysis, it was found that there is a gap that has not been addressed.

**Shoppers shop from multiple stores. They struggle to visualize & compare furniture from several stores. However, the majority of the companies including Ikea allow shoppers to select and visualize products available only in their stores.**

Moreover, Ikea’s place app does not provide a realistic rendering of multiple items of furniture in a space. Wayfair allows shoppers to browse from thousands of stores in one place. However, they are also limited to their products. Home Design & Decor and Overstock allow shoppers to compare furniture from multiple stores, but they do not let the shoppers visualize multiple pieces

of furniture together or compare various products, which is what people want as per their ideal shopping journey (as described in section 1.2).

### **Problem**

People shop from multiple stores and struggle to visualize & compare furniture from those stores. However, companies are using technology like VR, AR only to help shoppers visualize products available in their stores. Hence, this is the gap in the current market which I decided to further explore.

### **Current solutions for this problem**

Interior designers can bridge the gap by creating mood boards and 3D renderings of products from multiple stores for shoppers, which can help shoppers compare various products and visualize their future home design before making a purchase. Experienced interior designers have immense knowledge of the furniture market and can easily suggest options to shoppers as per their needs. This reduces returns and, in turn, reduces stress on both retailers and shoppers. Interior designers provide both online and offline services. However, hiring an interior designer is expensive, and not every person can afford to do this.

Modsy, a 3D modeling furniture service app, allows shoppers to select products from various stores available in their collection and create 3D models of the home on their own [28]. Their premium service includes having their in-house designer design a 3D model of the client's space based on the selections made by the clients. However, they have connections with very few furniture brands which restricts the user to a limited product catalog.

This gap needs to be explored further to identify the solutions which could improve design outcomes and reduce the possibility of buyer's remorse and, in turn, reduce returns.

People are concerned about overspending in their home designing journey. A study has shown that GenY or Millennials are less experienced in shopping for furniture, refer to multiple resources before selecting furniture for their home, and tend to have greater cognitive dissonance compared to older people [17]. Therefore, for this project, I decided to design for people between

the age of 25-45 and as such conducted further research with that age group to explore the problem in detail and identify opportunities.

## **Chapter 2 Primary research**

To further validate the unclear meaning, I decided to conduct primary research using qualitative and quantitative methods.

*Ethics approval was granted to me for this research. The ethics application can be viewed in the Appendices section at the end.*

For the qualitative analysis, I have conducted interviews and observations. For quantitative analysis, I have conducted surveys.

### **2.1 User Interviews**

I conducted 9 one on one interviews with persons from various backgrounds and between the ages of 25-45 years. The goals of the interviews were to understand the general attitude of people towards furniture shopping, to discuss if and what apps people currently use to support their furniture shopping, what they enjoy, and what they desire in their ideal shopping experience. I used open and non-leading questions to help participants talk more and provide more details in their answers.

Following are the questions used in the interviews:

- When was the last time you bought furniture for your house and what was the occasion?
- What is your typical home furniture shopping journey?
- Where do you usually take inspiration/references from?
- What is your process of finalizing the outlet to buy furniture from?
- What are the challenges you face while shopping for home furniture for your house?
- Have you ever experienced buyer's remorse after purchasing furniture? If yes, what was the reason?
- How do you think your furniture shopping experience can be improved?

## 2.2 Ethnographic research

One-on-one interviews can assist in gaining insights from the people I am planning to design for. However, people sometimes do not necessarily say or convey what they need or what they actually do. People forget a lot of the steps they go through and these missed elements cannot be found through interviews alone. To understand more about how people, do the things that they do, I conducted ethnographic research at Restoration Hardware which is a luxury retail store in Edmonton. I observed people in the store to understand how they shop for furniture.

## 2.3 Synthesizing research: Empathy Map

Based on the above qualitative research, I created an empathy map that shows what users said, did, felt, and thought during their furniture shopping journey (Figure 2-1).

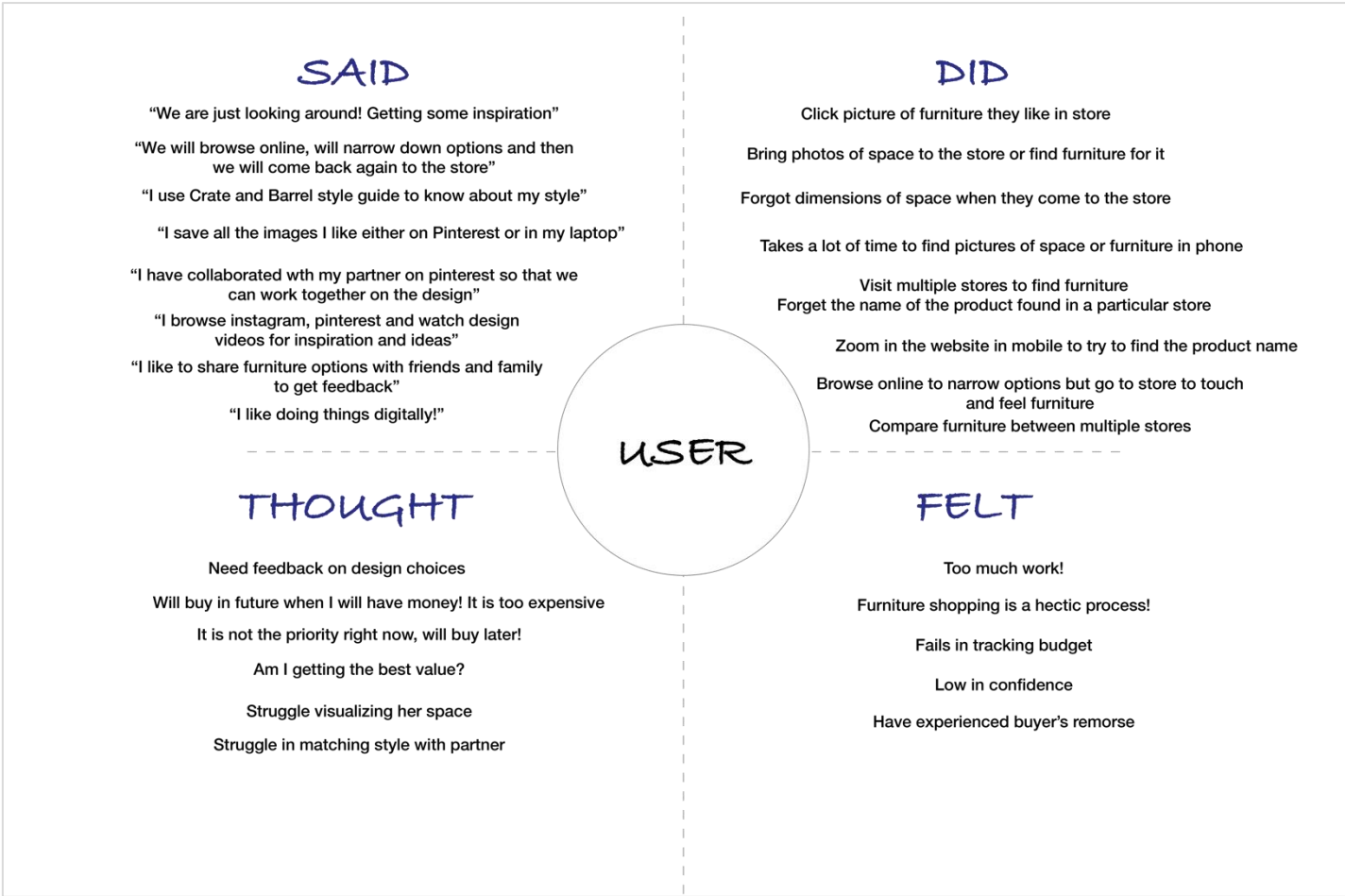


Figure 2-1 Empathy map to synthesize research

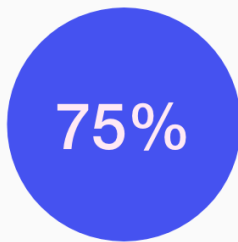


## 2.4 Survey

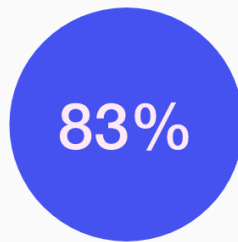
From the qualitative research, I found out why people do what they do. To also understand how many people are actually doing what they say they are doing, I decided to conduct user survey with 40 participants.

Following are the survey results:

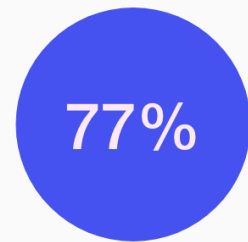
### Survey results with 40 participants



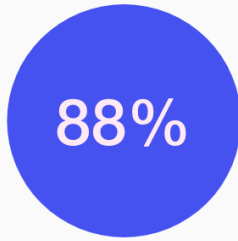
Participants use both online and offline channels to purchase furniture.



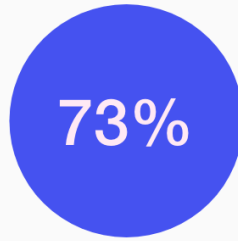
Participants visit more than 5 stores before finalizing furniture for their house.



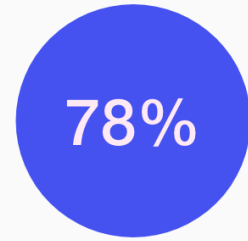
Participants struggle in remembering details of furniture visited at multiple stores



Participants prefer to see images next to each other for better visualization



Participants have faced buyer's remorse due to inappropriate furniture selection



Participants find furniture shopping to be a mixed experience (Happy as well as hectic)

*Figure 2-2 Results of survey conducted with 40 participants*

## 2.5 Synthesizing research: Affinity diagram

Affinity mapping is a recognized research synthesizing method which helps bundle groups of information by drawing connections between research insights [29]. With the insights gathered from interviews, observations, and surveys, I initially recorded everything on the sticky notes and then found out common patterns in the information to form clusters or groups. This has helped me to create user personas.

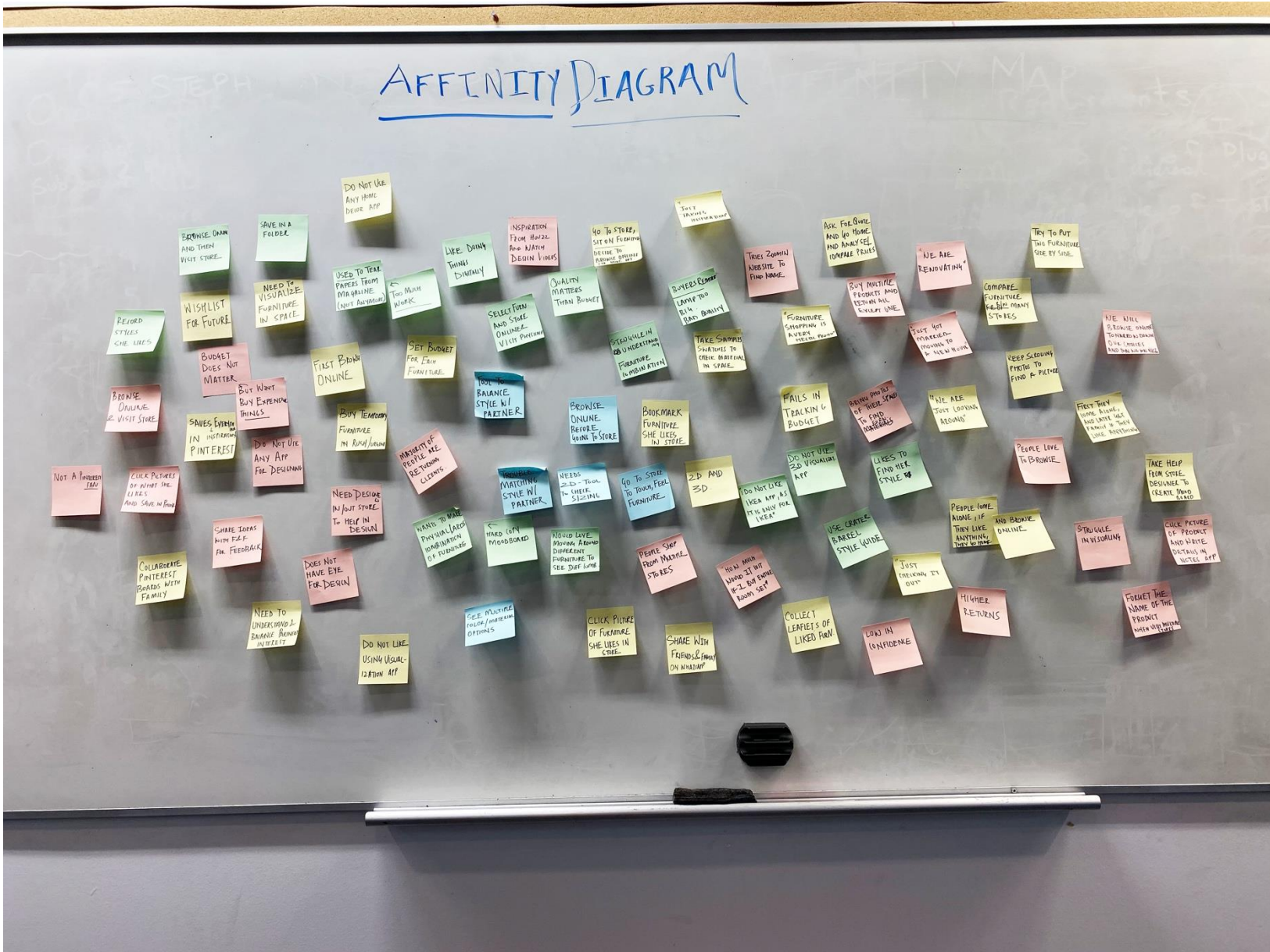


Figure 2-3 Affinity mapping process



Figure 2-4. Affinity mapping, finding patterns to form clusters of information

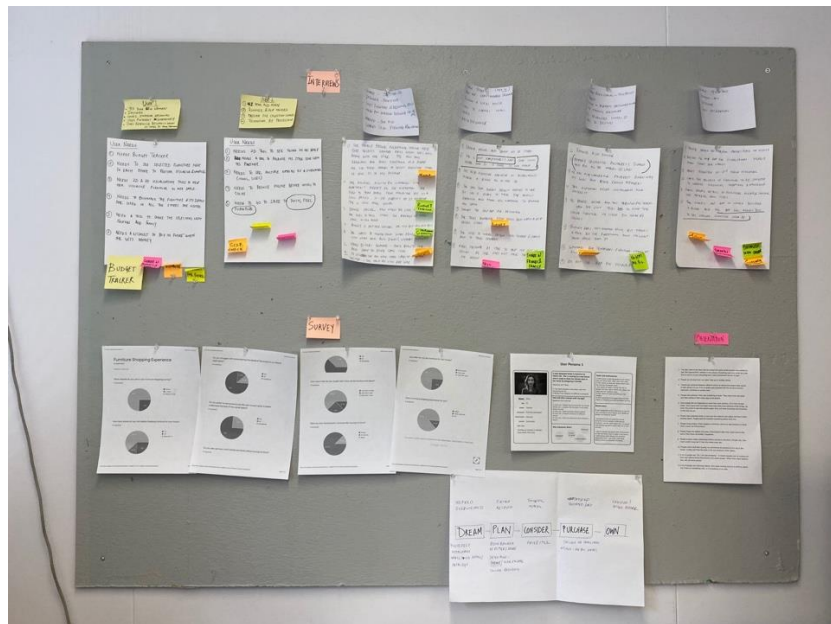


Figure 2-5 Data collected to create affinity map


## 2.6 User Persona

Based on both qualitative and quantitative research, I recognized 3 key user types:

1. Those who have little or limited knowledge in interior design and they have hired an interior designer to design their house and help them make selections.
2. Those who know a little about design and have designed everything on their own.
3. Those who have significant amounts of knowledge about design, and have designed everything on their own.

I created user personas for which I can design solutions.

**Persona 1: Jennifer Lacken**



“If I can get the chance to have small cards of all the furniture from all the 5 stores I like, so that I can play around with different combination of furniture, that would be great!”

**Occupation:** Lecturer  
**Location:** Alberta, Canada  
**Gender:** Female  
**Age:** 38  
**Marital Status:** Married  
**Education Level:** Masters in Design

Jennifer is a lecturer at a University and is interested in furnishing her new house. She has some decent knowledge in interior design. She selects furniture on her own and likes to take opinions from interior designer on her selections.

She has hired an interior designer in the past for her previous house to make the process easier for her as she has a busy schedule. However, she is still looking for ways to effectively communicate her design style to the designer and align with her partner as well as the designer.

**Goals:**

- Wants to effectively collaborate.
- Need printed furniture images to quickly make various combination to visualize what looks good.
- Need style guide to understand her own style.
- Need effective ways of browsing and saving furniture.

**Pain points:**

- Struggle to align with her husband's style for their home.
- Face difficulties in visualizing furniture from multiple stores.
- Struggle to keep track of budget.
- Not efficient in organizing her furniture research due to busy schedule.

Figure 2-6. User persona 1 (Profile image by Adobe XD UI faces plugin)

## Persona 2: Christina Hener



"I want to design my house with my husband so that we can align our styles for our house"

**Occupation:** Android developer

**Location:** BC, Canada

**Gender:** Female

**Age:** 32

**Marital Status:** In a relationship

**Education Level:** Masters in Computer Science

A well designed home is essential to her life. She is moving to a new house and prefer to design on her own.

She somewhat knows her style but would certainly love to explore more in the process of furniture shopping. She does not have much time due to her corporate job, and wants an organizer which could help her out in her shopping process.

### Goals:

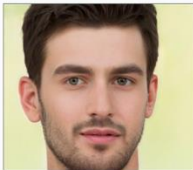
- Wants a well designed home where she can come after work and relax.
- Looking to live in a space which suits both her and her husband's style.
- Wants to keep everything within a budget
- Prefer to buy basic things first and eventually buy more things when she gets time.

### Pain points:

- Do not like Pinterest for furniture shopping as it is not specifically designed for furniture.
- Face issues in keeping track of her budget and her Wishlist.
- Not able to compare furniture from multiple stores.

Figure 2-7. User persona 2. (Profile image by Adobe XD UI faces plugin)

## Persona 3: Matt Frez



"I have been waiting to decorate my house since quiet a long time. I am ready to research a lot till I find exactly what I am looking for."

**Occupation:** Industrial Designer

**Location:** AB, Canada

**Gender:** Male

**Age:** 34

**Marital Status:** Married

**Education Level:** Masters in Design

Matt is an industrial designer, and he works in a multinational company. He recently got married and is moving to a new house.

Matt has a good aesthetics sense and wants to design his house on his own according to his and his partner's style. He is very passionate about designing his house and in process of conducting extensive research with her partner to buy home furniture and decor.

### Goals:

- Want to design his house combining his and his partner's style.
- Want to do extensive research before selecting style and items for the house.
- Prefer to design everything on his own with little help form friends and family.
- Open to exploring new productivity apps

### Pain points:

- Currently saves all the images in Google drive folder, and saves notes in Evernote. Not able to find an effective way to make image collages or combinations with details all at one place.
- Likes to research a lot, and looking for something similar to Evernote web clipper but specifically for furniture and home decor which is not available in the current market.

Figure 2-8 User persona 3. (Profile image by Adobe XD UI faces plugin)

## 2.7 Journey Map

Based on the personas I created, I mapped out a furniture shopping journey of the users. This helped me identify opportunity areas at each stage of the shopping journey.

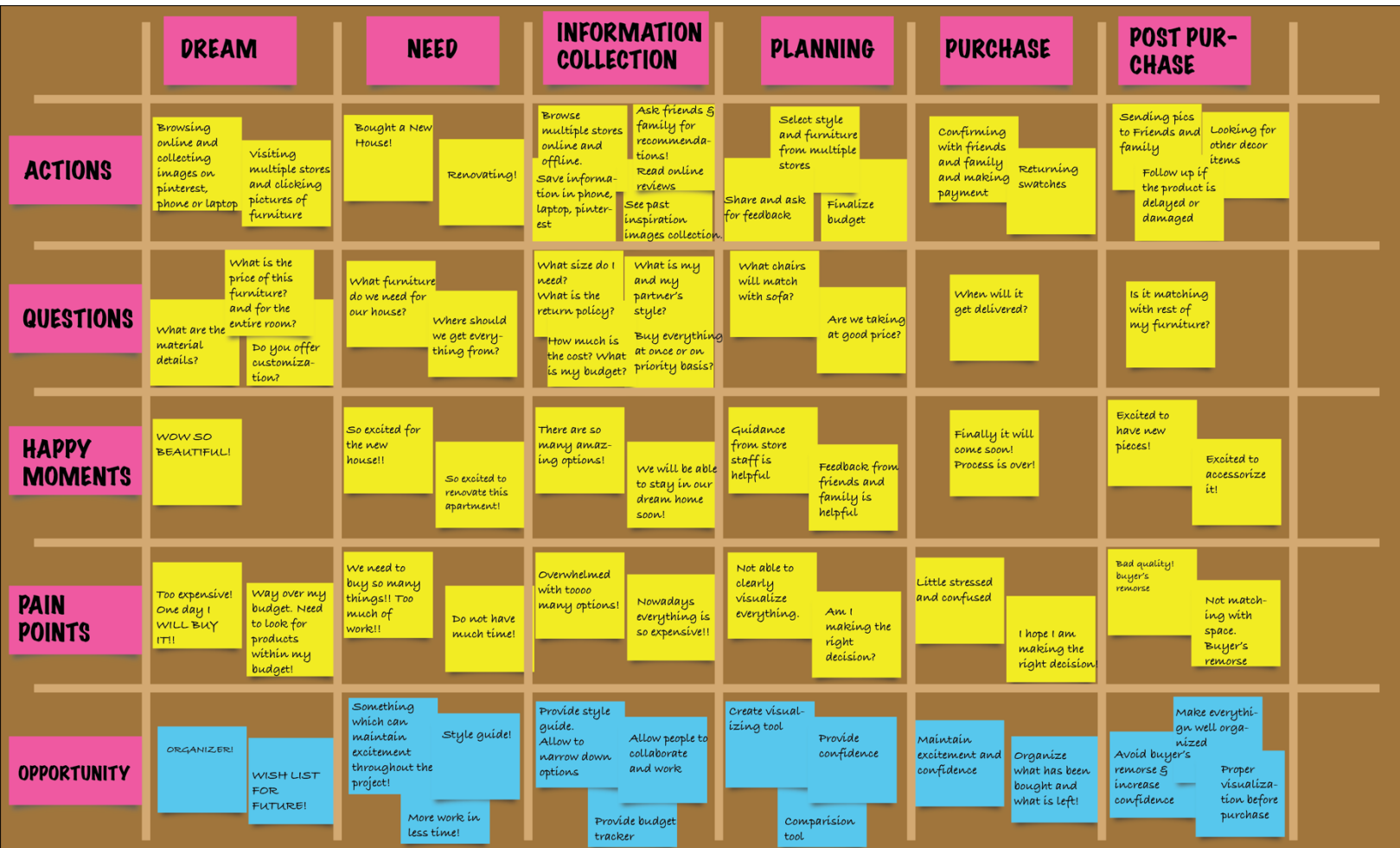
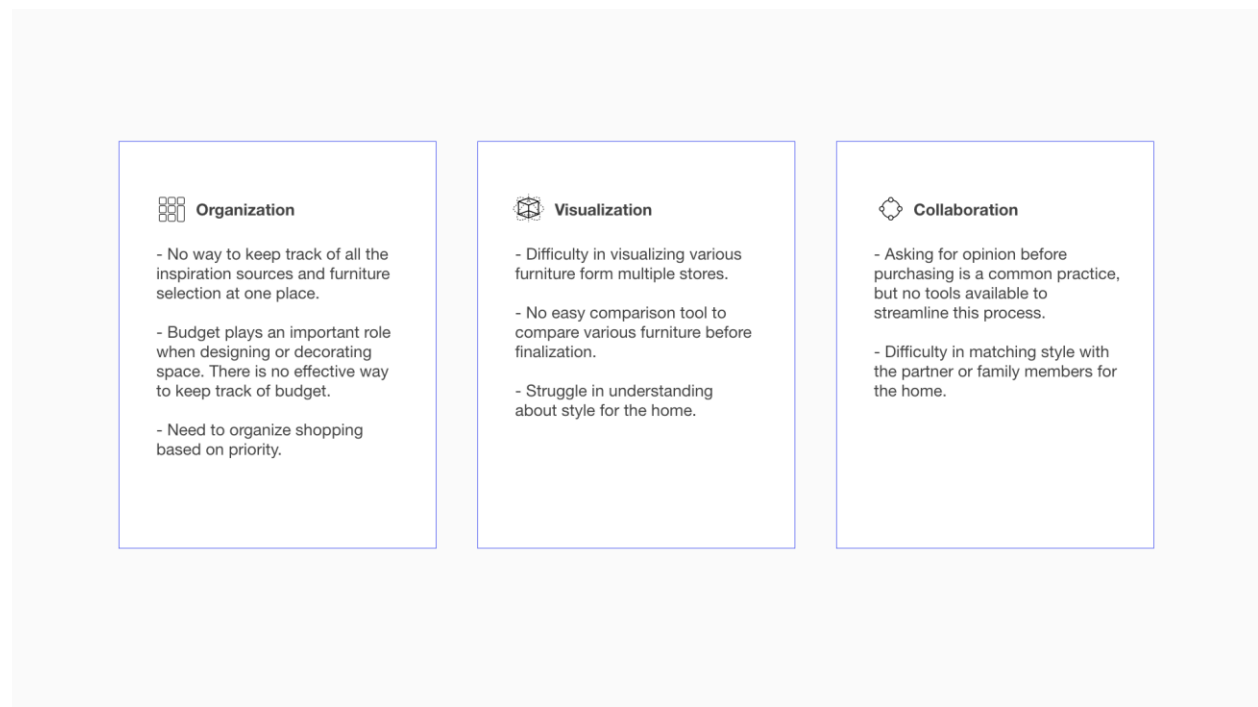


Figure 2-9. Customer journey map created to identify problem areas at each stage of shopping journey

## 2.8 Insights

After analyzing the data from affinity map and journey map, I was able to categorize the insights into these 3 major categories



*Figure 2-10 Insights from Primary and Secondary research*

## Chapter 3 Designing Solutions

### 3.1 User Goals

Based on the above insights, I decided to focus on three main user goals:

1. To organize the furniture browsing and selection process.
2. To visualize and compare furniture from multiple stores
3. To easily collaborate with other people

To meet these goals, I decided to design a web application that would support user’s online browsing process and a mobile application which would support user’s in-store shopping experience.

### 3.2 Design Inspiration

I browsed various home design & decor apps and decided to name my app SPACES. This name is related to other standard design apps and can help users easily identify that the app is related to home furniture or interior design while browsing in App store or Google play store.

**SPACES is a project management app for home owners who are looking to purchase furniture to design their home.**

Therefore, to get inspiration for my designs, I researched some of the top project management apps used in tech companies to manage teams or documents.

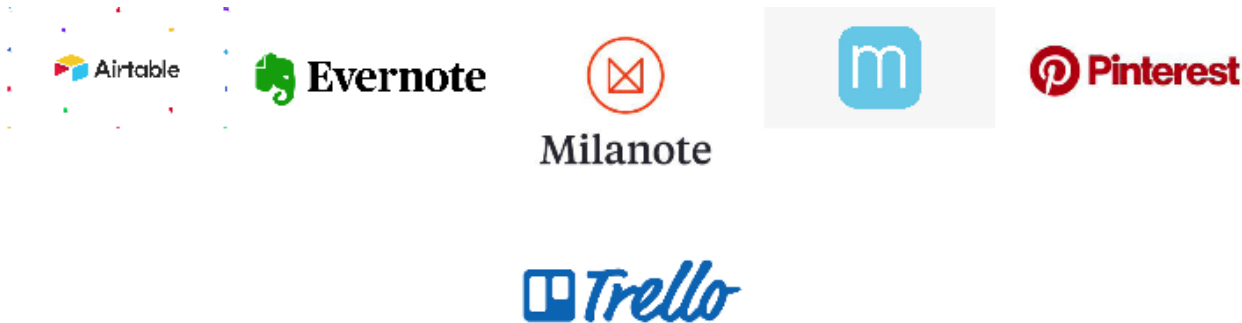


Figure 3-1. Companies that inspired me. (All the images are taken from multiple sources on Google.)

I noted down all the interactions I perceived that fit my app requirements and the features that can be designed to solve problems in home furniture shopping.



### 3.3 Brainstorming

I brainstormed solutions based on the app goals mentioned in section 3.1. I came up with 30+ ideas and using IBM Prioritization grid [30], I selected the features to be used in the app.

**Goal 1: To organize the furniture browsing and selection process.**

- Cloud based app and data can be accessed from multiple devices
- Browse online and use web clipper to save in app
- Add photos using phone camera directly in the app
- Current and future Wishlist
- Place to store all notes with photos
- Budget tracker
- Collaborating with other people
- Reference files storage
- Measuring tools with camera
- Augmented Reality color scanner/tracker
- Scanner to save details for printed information in app
- Using app scanner to directly parse information from printed material and autofill it in the image details section

**Goal 2: To visualize and compare furniture from multiple stores**

- Compare furniture with prices
- Download images from various stores, print, cut & make combinations
- Change color of elements in images
- Make combinations for various furniture from various stores - Moodboard
- See furniture in rough proportion
- Compare inspiration and furniture to be bought
- Compare different rooms styles (thought or designed)
- Virtual designer and In-person design at low cost
- Design guidelines or style templates
- A board to allow people to make rough sketches

**Goal 3: To easily collaborate with other people**

- Community/forum to ask questions and get feedback
- Share furniture selections personally to friends for feedback
- Share on social media
- Collaborate and work with people on projects together
- Make comments on someone's design ideas put in the project
- Use pin or anything to specifically make comments on designs
- Add a white boarding collaboration feature where people can brainstorm on design ideas together

Figure 3-2 Solution-Features list

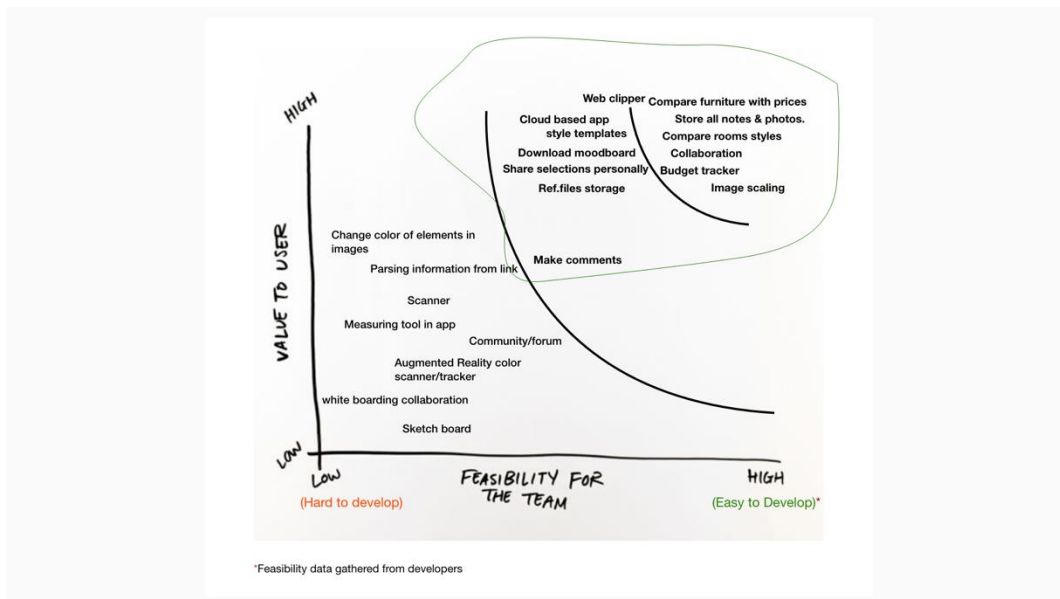


Figure 3-3 Selecting features for app

### **3.4 Assumptions, limitations and trade-offs**

#### **Assumption**

I assumed that the furniture companies will have all the images of furniture available in various color combinations in their product catalog or can create images on customer's demand.

#### **Limitation**

To keep the experience simple for the users and easier to develop for businesses for the first version, I have not included several features in my design (for the first version) which can be beneficial for the users such as:

1. Using an app scanner to directly extract information from printed material and autofill it in the image details section.
2. Use various Photoshop-like easy filters to edit colors of the images in moodboards itself
3. Measuring tool inbuilt in the app to measure spaces.
4. Currently supporting only CAD and USD.
5. Currently supporting only alphanumeric characters in the English language.

#### **Trade-offs**

People can give feedback on moodboard as a guest without signing in to account. This is done to make it easier for users to receive feedback from multiple people. This initially may not increase sign-ups but will make several other people aware of the app who may eventually sign up to the account and thereby increasing its business value.

### **3.5 Story Board**

To better understand how people are going to use my app, I created a story board which essentially shows the major steps users will go through in their furniture shopping journey and how my app can benefit them.

User: Christina Hener, 32 Years old, Developer  
 Shini recently got married and looking to buy furniture for her bedroom


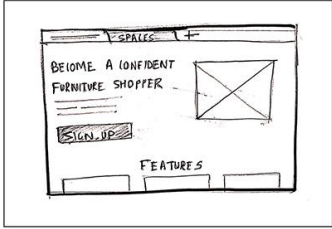
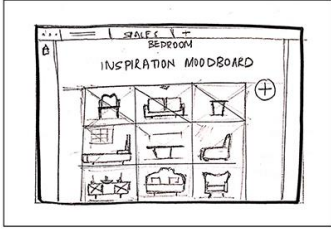
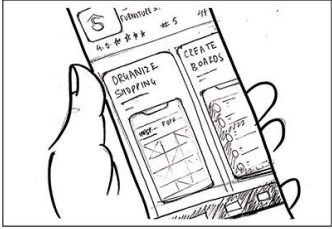
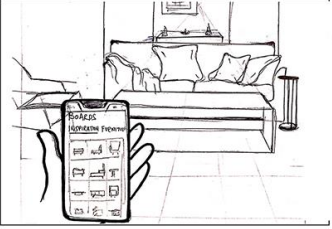

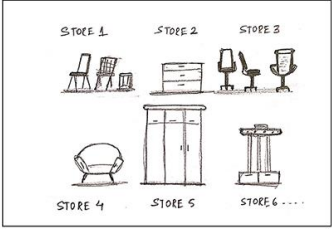
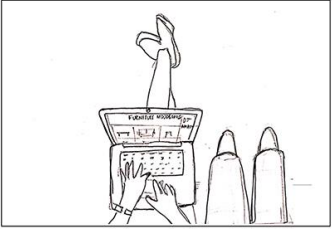
1		2	
	<p>Shini is browsing furniture online at home &amp; gets overwhelmed with options. She is finding it difficult to visualize and buy various furniture as per her budget.</p>		<p>She finds out about SPACES while browsing online &amp; visit the website. After going through all the features on landing page, she signs up.</p>
3		4	
	<p>She creates an inspiration board with all the images that inspires her. She collects images from social media, websites and SPACES templates</p>		<p>After creating inspiration board, she downloads the mobile app. Mobile app syncs with her web app account.</p>
5		6	
	<p>She visits furniture store and keeps checking her inspiration board while checking furniture in store, to keep herself aligned with the inspiration she collected for her bedroom.</p>		<p>She clicks pictures of furniture she likes and save the details in furniture board in her SPACES app.</p>
7		8	
	<p>She visits multiple furniture store and save the details of furniture she likes in furniture board in her SPACES app.</p>		<p>Shini goes home and looks at her furniture board on her computer and analyzes options with her husband. She also shares the board with her friend. After receiving feedback from her friend, she decides to purchase.</p>

Figure 3-4 Story board

## 3.6 Web app Design

### 3.6.1 User Flow

I have created a user flow to understand the step by step process of how the user will accomplish the task using the app.

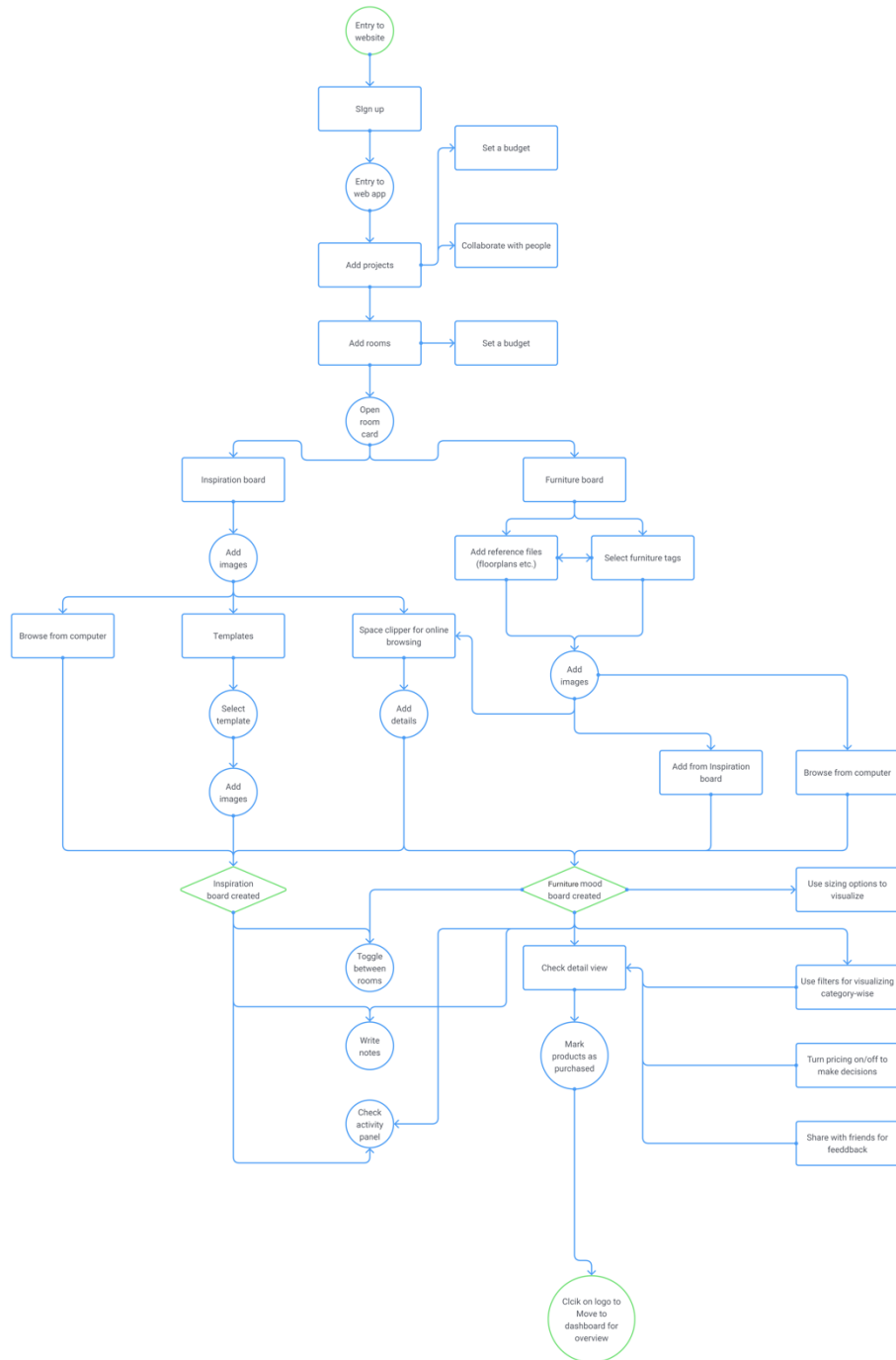


Figure 3-5 User flow

### 3.6.2 Conceptualization

Based on the following goals which I also stated in section 3.5, I developed quick sketches of the features I selected in section 3.3 and then created digital wireframes.

Three main user goals:

1. To organize the furniture browsing and selection process.
2. To visualize and compare furniture from multiple stores
3. To easily collaborate with other people



Figure 3-6 Rough sketches created during ideation stage of web and mobile app design

### Iterations

**#Goal 1:** To organize the furniture browsing and selection process.

**Iteration 1** (Figure 3-7)

To achieve this goal, I started by dividing the web app into 3 main parts: Inspiration, Furniture, and Purchase. In the inspiration section, the user can collect inspiration images. In the furniture

section, the user can add furniture they are considering buying or planning to decide between various options. In the purchase section, the user can see the purchase list of the entire project to keep track of the product purchased for each room in the project. The user also has the ability to create a wish list for future purchase. Through my research, I found out that the budget plays an important role in selecting furniture for the room. Therefore, I added a feature to see the budget in the purchase section.

When it comes to furniture shopping, people do extensive research online. To support their online browsing experience, I designed a web clipper. This web clipper can help them directly save images from the web to their inspiration or furniture moodboards instead of first saving them into the computer. Also, the web clipper allows the user to add details of the furniture while saving the image so that all the details remain in the same place.

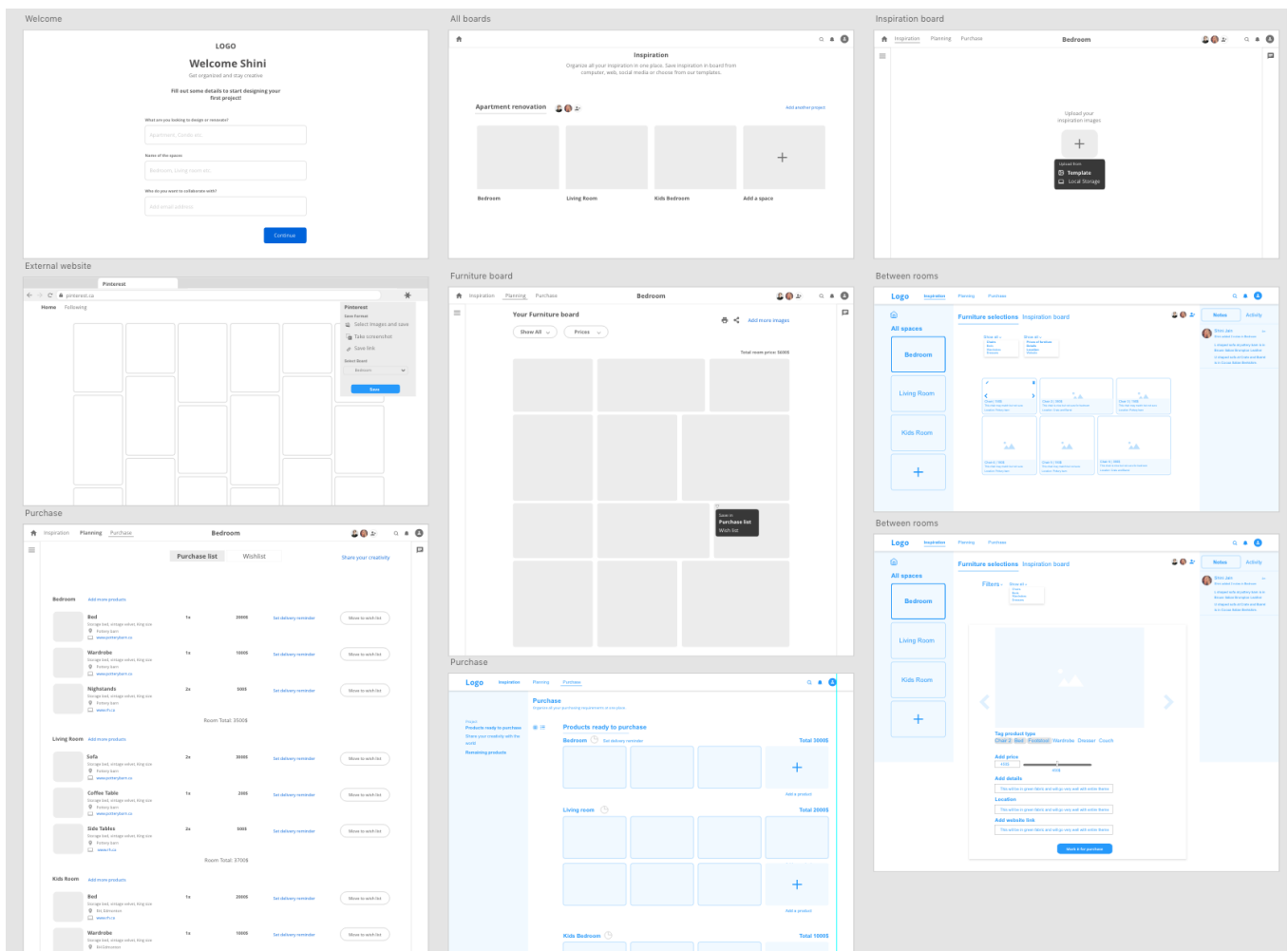


Figure 3-7 Organization: Iteration 1

## Iteration 2 (Figure 3-8)

After discussing my first iteration with the target users of my app and my supervisor, I made the following changes:

The three tabs were a bit overwhelming for the users. Also, the purchasing section is essentially a part of the furniture tab. Therefore, instead of having three tabs in the navigation bar, I decided to combine the purchase and the furniture tabs. Moreover, in my first iteration of the purchase section, I showed the purchase lists of all the rooms in one place, assuming it will help users keep track of all the items they have purchased. However, instead of having the purchase list of all the rooms, I decided to keep only a room-specific purchase list to allow users to focus on one room. If the users want to quickly scan the items they have purchased for each room, they can see it on the dashboard.

Moreover, instead of having to create two lists: purchase list and wish list, I decided to make the experience simple by allowing them to directly mark the items they want to purchase and the remaining items will be there in the detail section itself (as a wish list) until they delete it.

After reflecting on my research insights, I found that budget is one of the most important factors for users when it comes to selecting furniture for the house, and so I decided to keep it on the dashboard for users to quickly track their budget for each room.

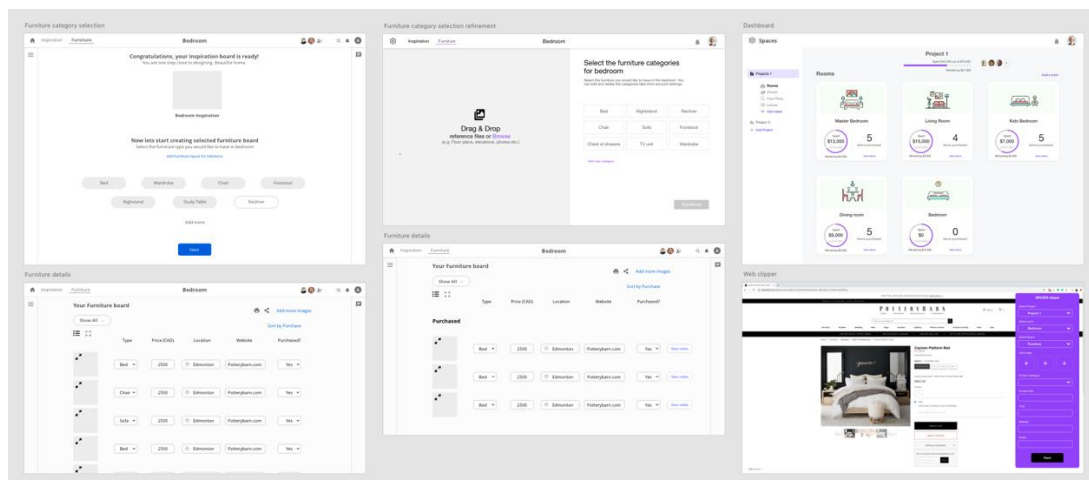


Figure 3-8 Organization: Iteration 2

## #Goal 2: To visualize and compare furniture from multiple stores

### Iteration 1 (Figure 3-9)

In my research phase, I found out that people want a style guide or reference which can help them understand the style they like and want to incorporate in the interiors of their house.

Therefore, I created a template section in the web app, which includes some of the most common interior styles which exist in the market. People can browse these templates to understand their style which can help them visualize the kind of furniture they want for their house.

The most common behavior I observed when buying furniture is that people make various furniture combinations. They try to visualize how one piece will look with the rest of their other furniture. Therefore, I decided to keep various furniture options of the same category in the same grid box. Once the user hovers on any image, the left and right arrows will be visible and users can see how a particular furniture category is looking with other categories.

In this iteration, I also worked on how users can compare various moodboards from the dashboard.

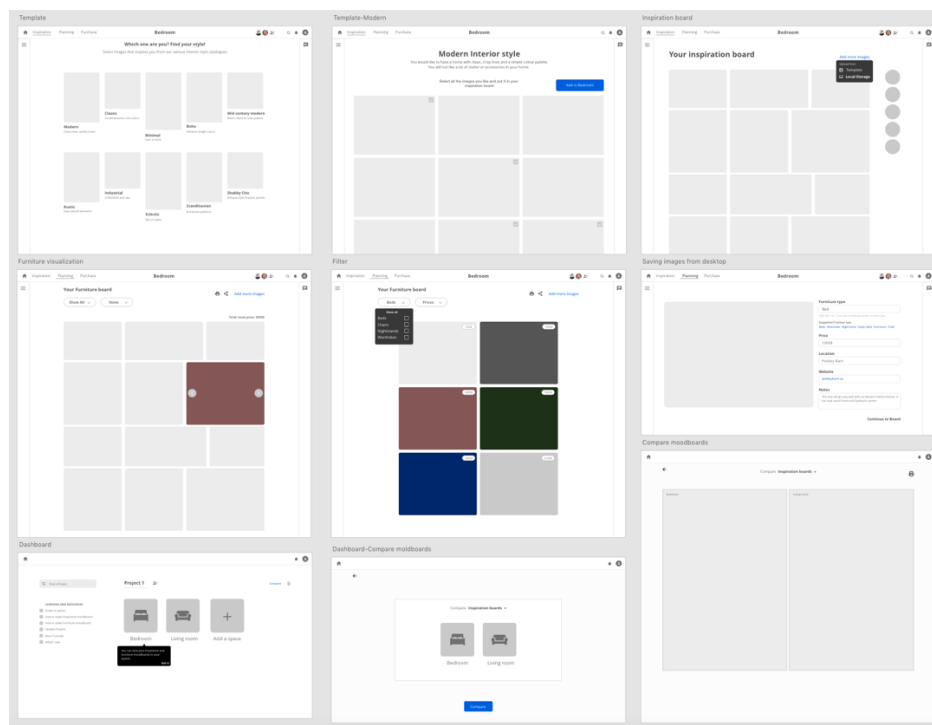


Figure 3-9 Visualization: Iteration 1



## Iteration 2 (Figure 3-10)

To help people see images in the moodboard proportionally, I created a three-column grid. Users can resize the image as per their preference to visualize furniture items in proportion to other items.

Also, as budget is an important factor for users when selecting furniture, when the users will make multiple furniture options in the furniture moodboard (using left and right arrows), the room price displayed above the moodboard will change as per the combinations. This will help users to not only see the individual prices of each item of furniture but also the overall price of the room before making their final selections.

Also, I designed a feature to help users to toggle back and forth between various rooms to keep the design of the entire house in harmony.

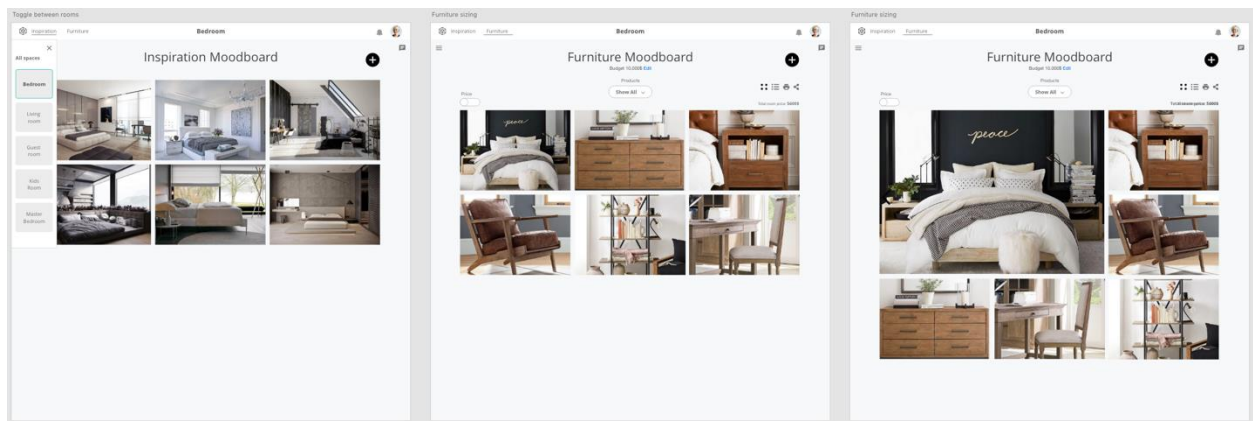


Figure 3-10 Visualization: Iteration 2. (Images in the web app design have been taken from multiple sources on Google)

### #Goal 3: To easily collaborate with other people

#### Iteration 1 (Figure 3-11)

I designed a feature to allow the user to add more people to the project to collaborate with. This is designed such that if the users want to collaborate with family members or friends, then everyone can remain in sync for the design of the house.

The activity panel is designed to help collaborators communicate about the project. The user can also share the link of the moodboard and receive feedback from people other than project collaborators. People who are giving feedback need to sign in to the app to provide feedback.

In my initial iteration, I also added the option to create a moodboard of the images of the house after all the furniture has been bought. This final moodboard can be shared by the user on their social media profiles.

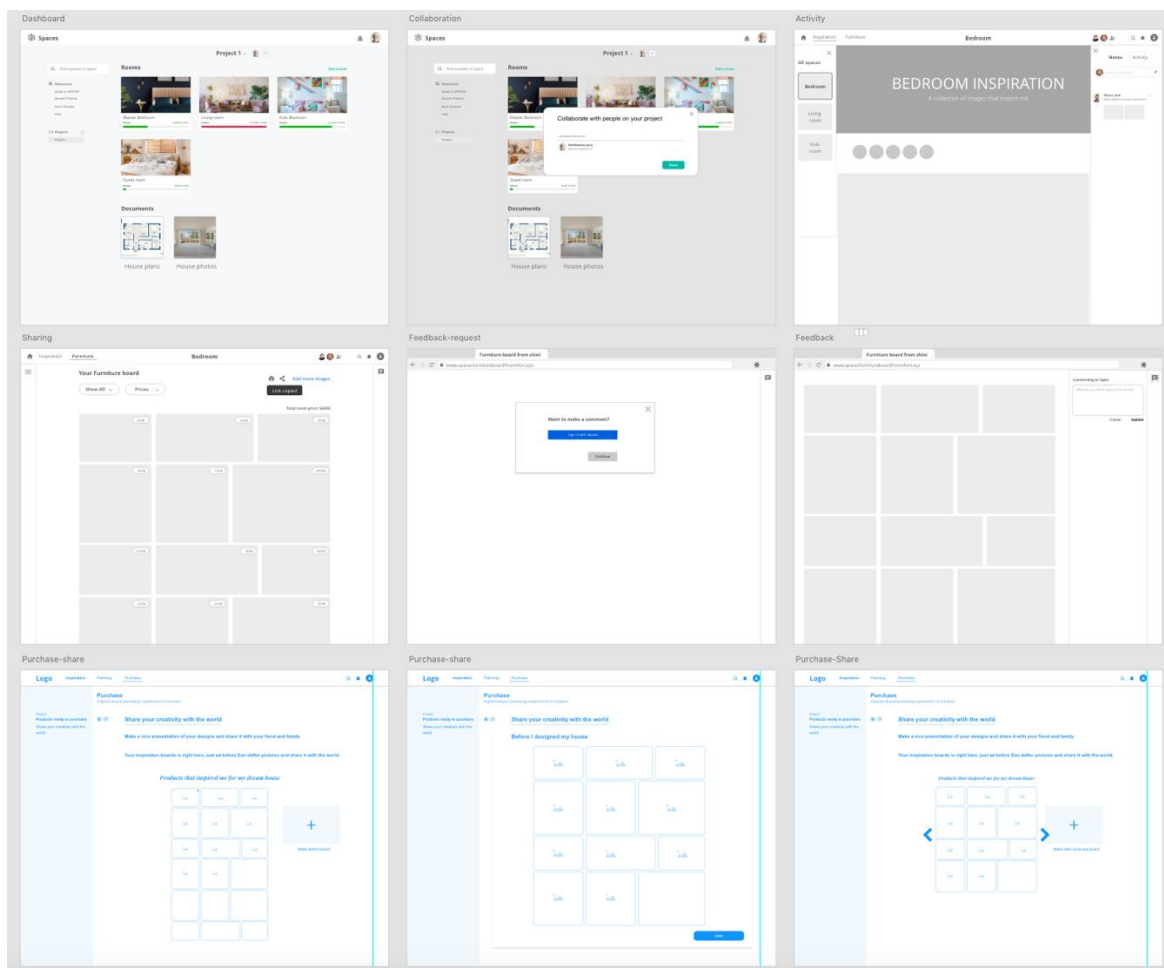


Figure 3-11 Collaboration: Iteration 1 (Images in the web app design have been taken from multiple sources on Google)

## Iteration 2 (Figure 3-12)

During the user interview stage of my project, I found out that users like to have opinions from various people on their furniture selections to make sure they are making the right decision. However, I found out that the majority of the people do not prefer to sign in to an app, just to provide feedback. To make it easier to provide feedback on the moodboard, I decided to allow people to sign in as a guest. This will help the users to receive feedback from a large number of people.

Also, if the link will be shared with a large number of people for feedback, a lot of the people will become aware of the app and may consider signing up with the app which will generate additional business revenue for the app.

Moreover, to make it easier to provide feedback on a specific part of an image, I designed a drop-pin function. People can drop the pin anywhere on the moodboard, and make comments.

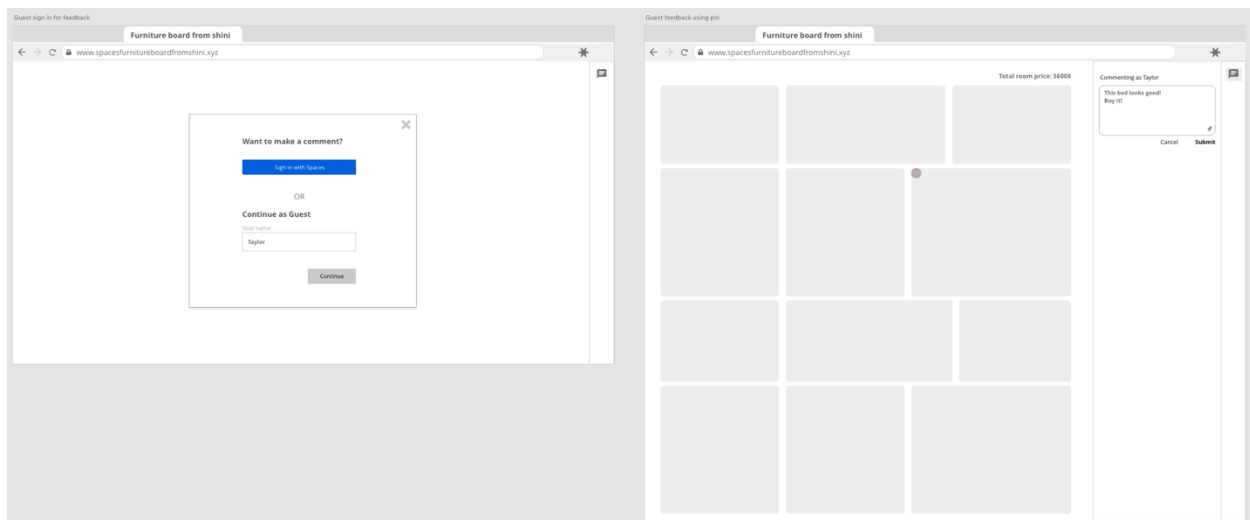
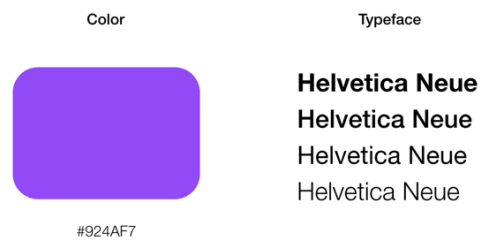


Figure 3-12 Collaboration: Iteration 2

### 3.6.3 Style Guide (Figure 3-13)

**Colour Scheme:** I went with one colour theme for the application design. This allows the images of the furniture in the moodboards to not be dominated by the app's colour. I chose purple as the colour for the app because according to colour psychology, purple is associated with royalty, luxury, and elegance [31]. As this app is helping people to enhance their lifestyle by incorporating furniture in their house to design interiors, I believe the colour suits the purpose of the app.

**Typography:** I selected Helvetica Neue for the app design. Helvetica is a Sans serif font originally designed by Swiss typeface designer Max Miedinger [32]. It is a neutral font as it lies between modern and classic or elegant and relaxed. I wanted to keep a neutral font because people can have furniture or interior images in their moodboard of various styles and I did not want the font to influence the moodboard style people have created.



*Figure 3-13 Color and typeface chosen for web app*

# Chapter 4 High Fidelity prototype

## 4.1 Web app

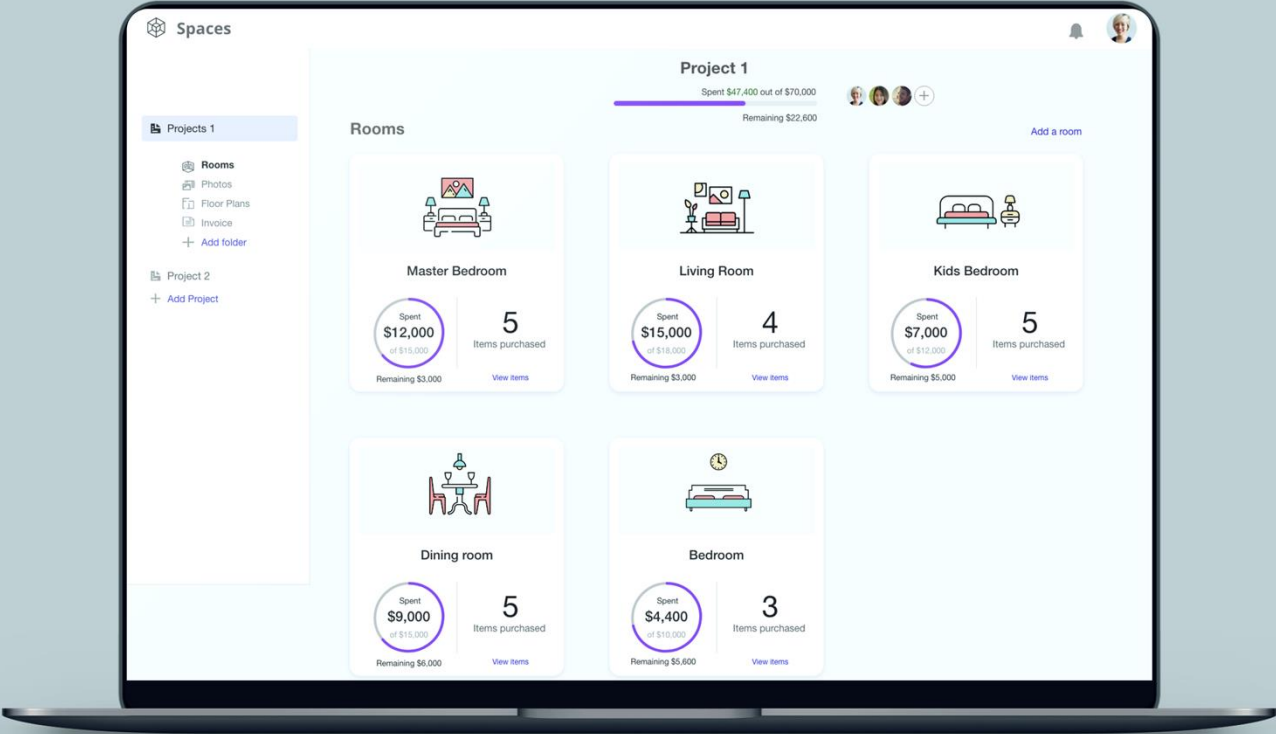


Figure 4-1 Web app final design in laptop mockup

### **Home screen** (Figure 4-2, 4-3, 4-4, 4-5)

On the home screen, the user can keep a high-level track of all the projects. A user can see the number of items marked as purchases for each room and can track the budget (Figure 4-2). The user can add a new room to the existing project and assign a budget for it. Adding the budget can help users manage their budget effectively and can avoid going over budget for the entire house (Figure 4-3). (#Goal 1).

On the left side panel, there are multiple resources that can help users to get familiar with the app. Also, the app will allow users to add multiple projects in the space, which can be quickly accessible from the side panel. The user also has the option to collaborate on the project with other people. This will allow the user to stay aligned with the style of the other collaborator (Figure 4-5). (#Goal 3)

After the user works with this app for a while for planning furniture selections for various rooms of the project, the home page will allow the user to keep track of the status of each room. The user can track the number of items he purchased for each room, and the remaining amount left from his budget for each room (Figure 4-4). All the documents related to the project like plans, photos of the home, etc. can be added to the project for reference while selecting furniture.

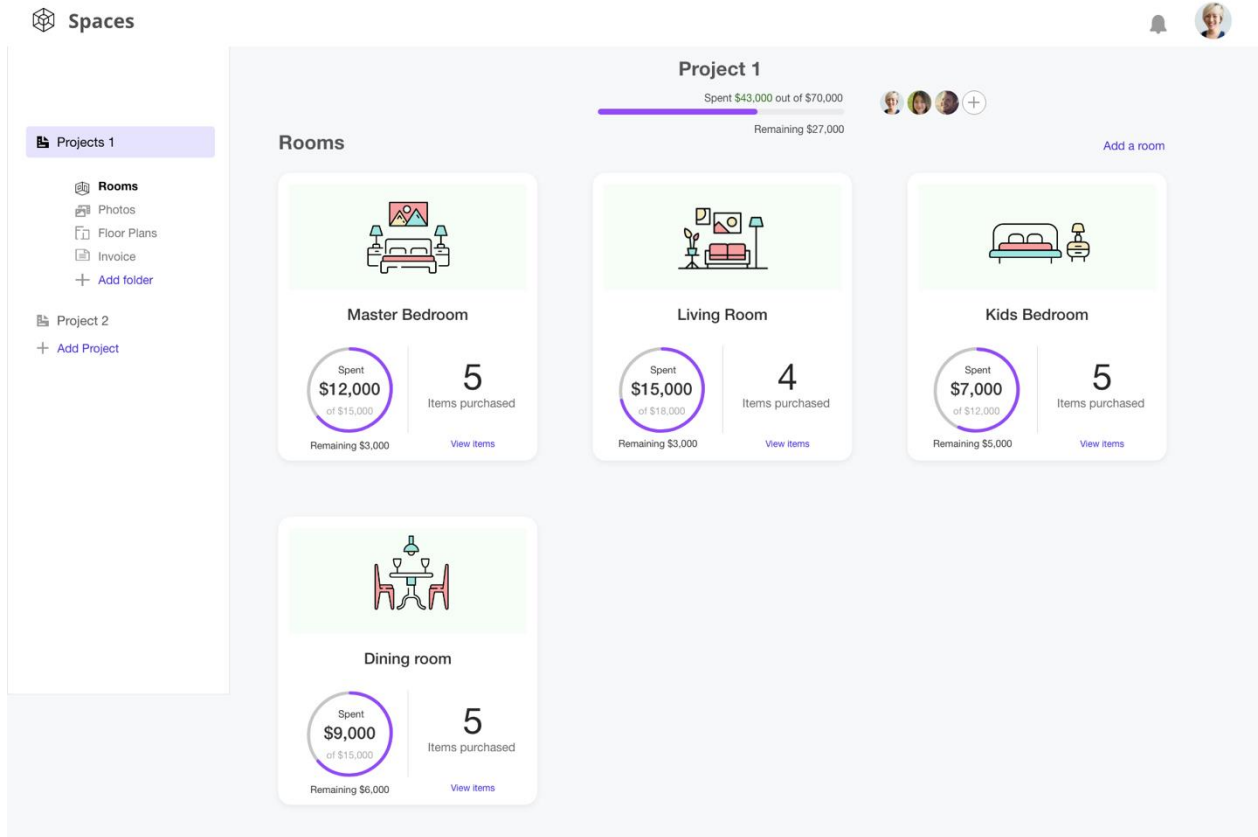


Figure 4-2 Dashboard

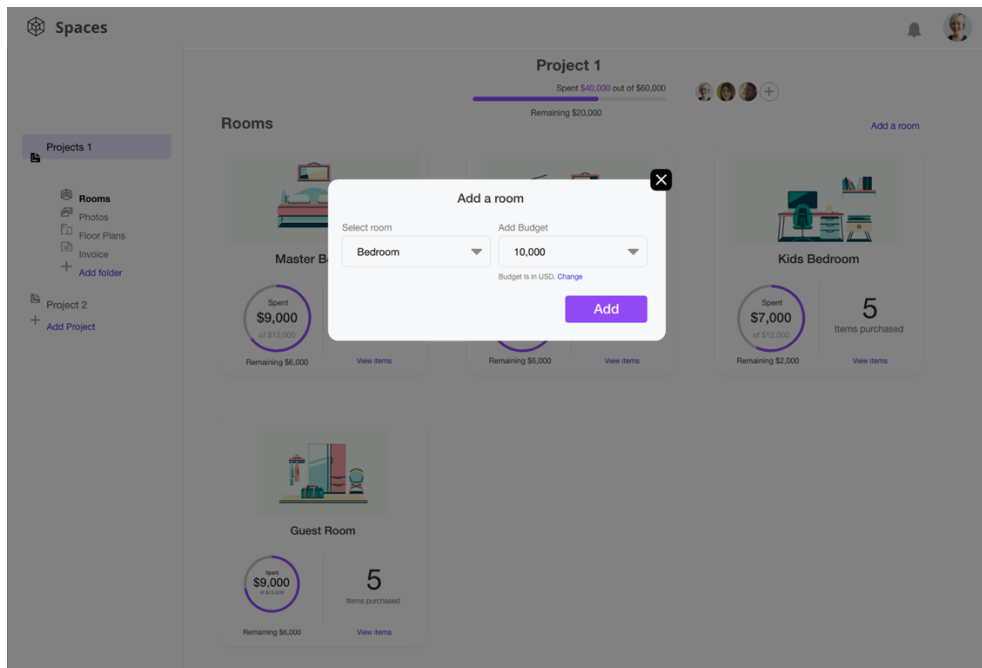


Figure 4-3 Adding room

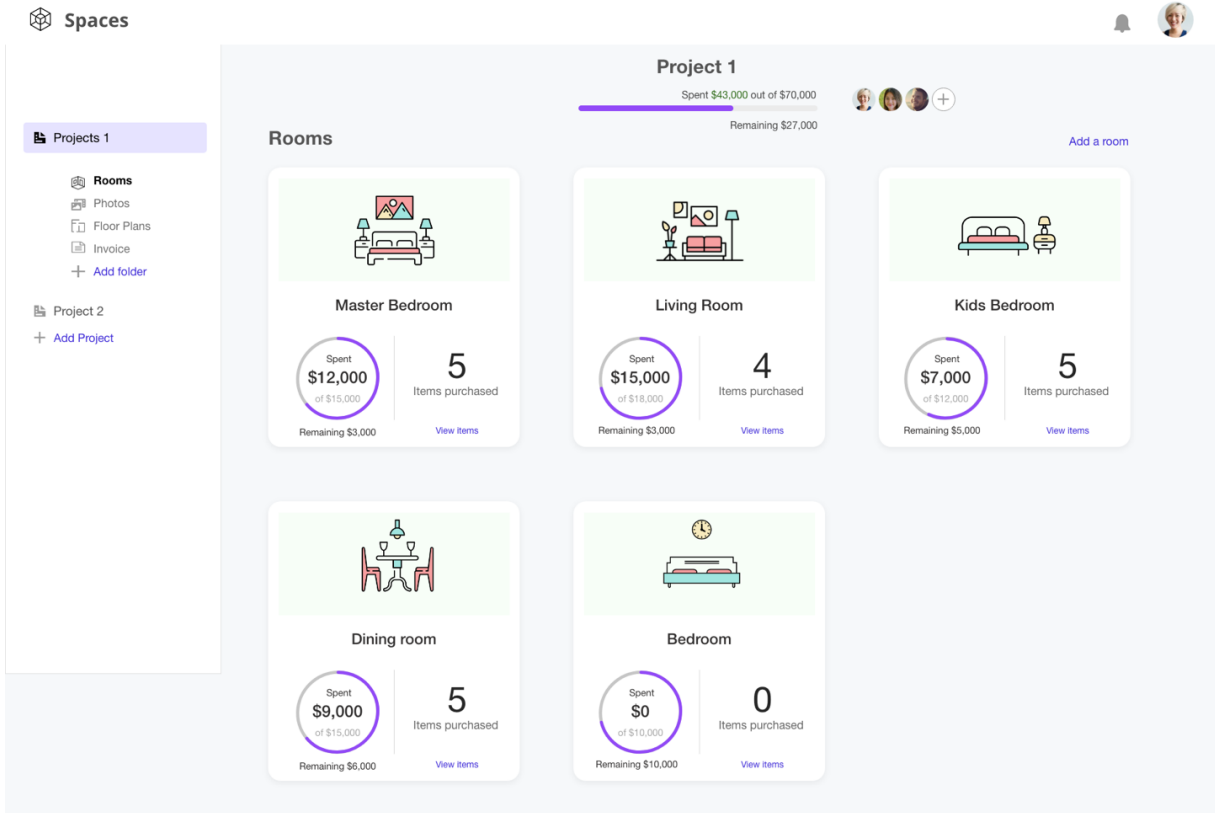


Figure 4-4. Home page: Room added

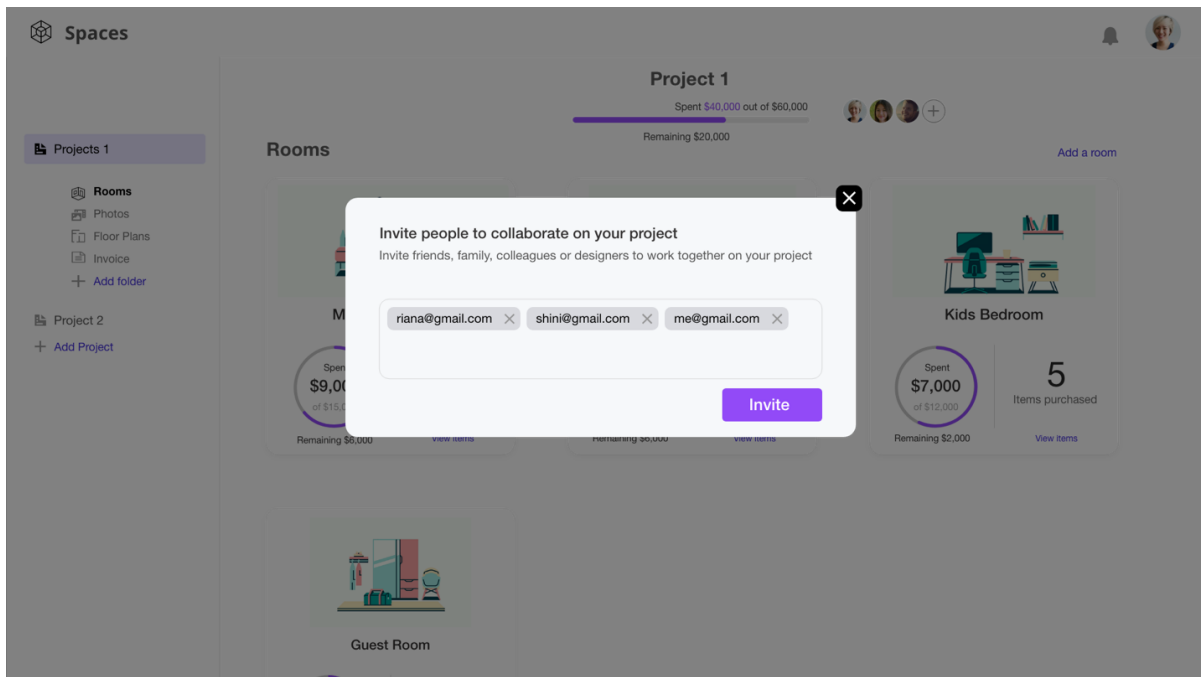


Figure 4-5 Adding collaborators



After the user clicks on the room, the user will see two options:

- 1) To make an inspiration board by collecting all the inspirational images in one place.
- 2) To make a furniture board, where the user can compare multiple furniture items and make final selections.

### **Inspiration board** (Figure 4-6)

If the user wants to collect some inspiration before starting with the furniture board, they can start making the board by adding inspiration from various sources. There are multiple ways to collect inspiration. Users can collect inspiration from existing templates, or can browse online to collect inspiration. Once the user clicks on the room thumbnail, the grey grid will be displayed to give the user an idea of how the images will be displayed once they add the image.



Figure 4-6. Inspiration moodboard

### **Templates** (Figure 4-7 and 4-8)

If the user does not have any particular interior style in mind or wants to browse the existing collection, the template section can help them understand various interior styles existing in the

market and search for inspiration based on their preference. I have researched the interior market standards for the style names and used the same in the app so that it becomes easier for users to search for the same style on other websites. This also follows the rule “#4: Consistency and standards from heuristics evaluation by Neilson and Norman [33].

I have given a short description of each style in the template section to give a brief idea about the style to the users before they decide to open one. Once a particular style matches the users’ interest, they can open the style to see all the inspiration images related to that style. The users can add the images they like to the furniture board from here.

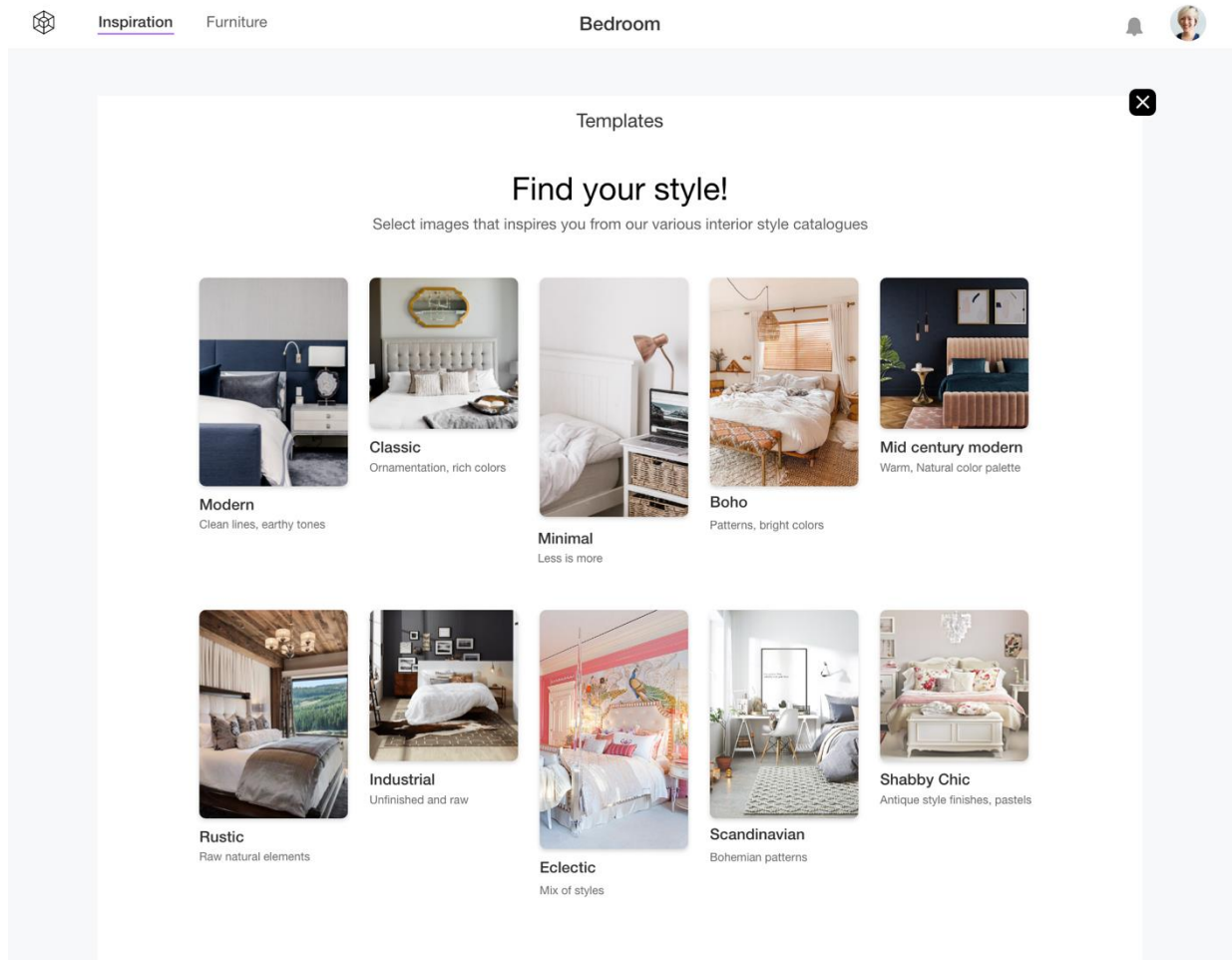


Figure 4-7. Interior style templates. (Images in the web app design have been taken from multiple sources on Google)



All templates

## Modern Interior Style

You would like to have a home with clean, crisp lines and a simple colour palette.  
You will not like a lot of clutter or accessories in your home.

Add inspiration

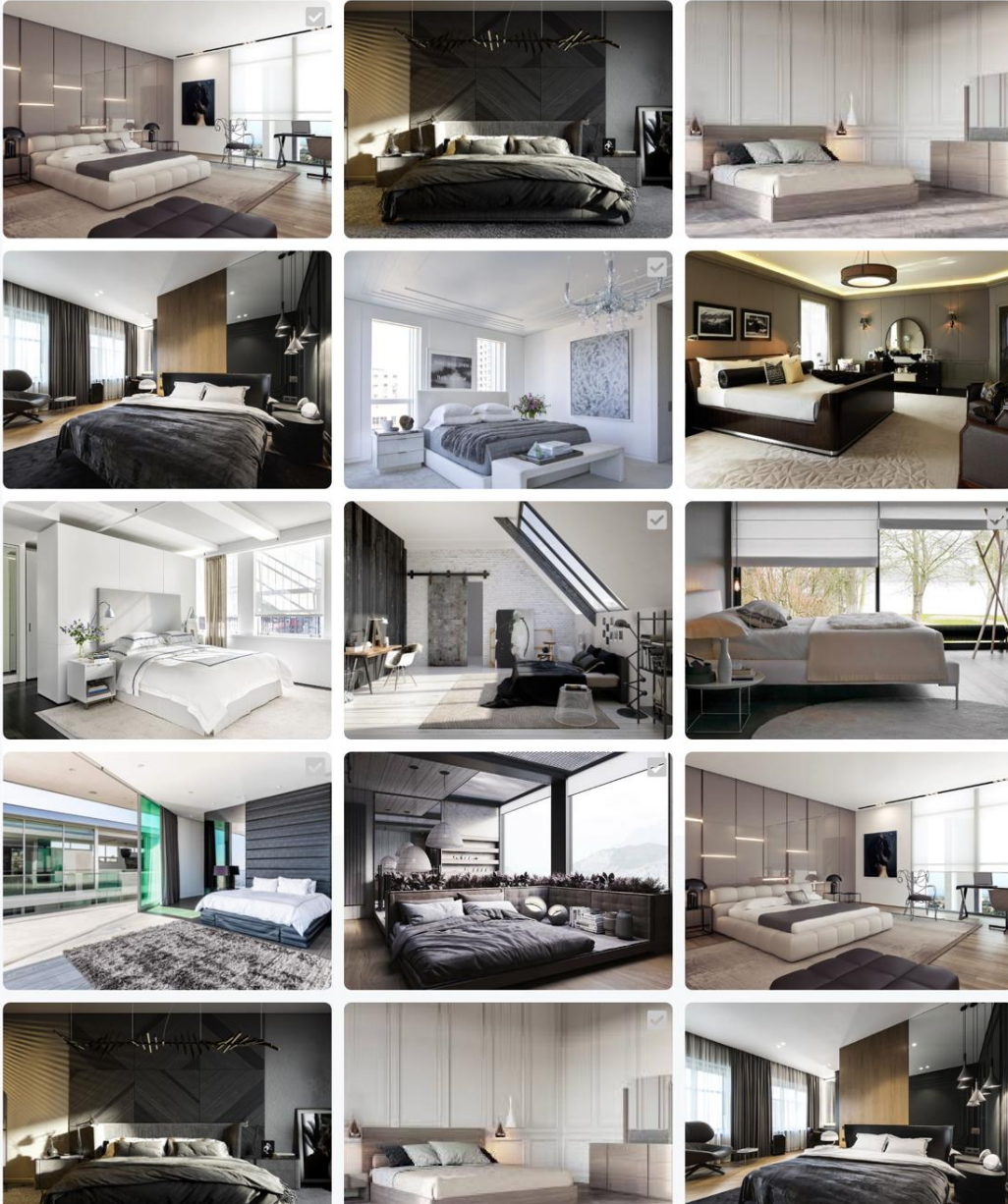


Figure 4-8. Modern interior style template. (Images in the web app design have been taken from multiple sources on Google)

## Spaces Clipper (Figure 4-9 and 4-10)

The most common way to collect inspiration is by browsing online. While browsing online, users can use a feature called Spaces Clipper. Spaces Clipper is a chrome extension of this Spaces app, which lies in the tab bar once the user downloads the extension. When the user browses online, they can click on the Spaces Clipper and can select whatever image they get that was inspired by and it will directly get saved in their Spaces account.

In the Spaces Clipper dialogue box, I have given the option to select the project, room, and board, to help users remain organized in the browsing process. (#Goal 1).

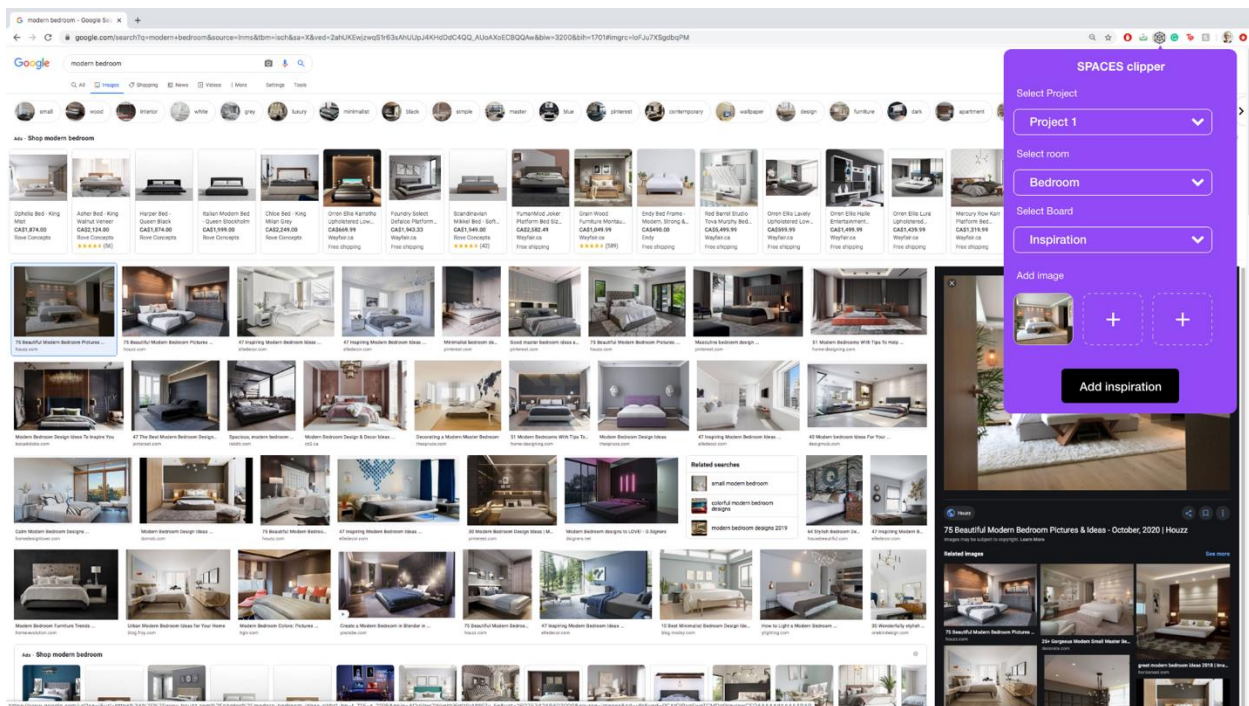


Figure 4-9 Space clipper: Add details (Images in the web app design have been taken from multiple sources on Google)

Once the users select multiple images, all the inspiration images will be saved directly in the inspiration board (Figure 4-10). This inspiration board will be very useful for users when searching for furniture for their homes, as they can refer to this board when making actual furniture selections. This will help them keep on track (#Goal 1).



Figure 4-10. Inspiration board (Images in the web app design have been taken from multiple sources on Google)

### Toggle between different rooms within the web app (Figure 4-11)

Users have the option to toggle between multiple rooms to keep themselves on track with the style of the overall home and to keep all the styles in sync with each other. The “Hamburger” icon (which resembles a hamburger) is like a button in the websites or apps which mainly opens side navigation drawer (or side panel). The users can click on this icon (Figure 4-11) to expand a window (or side panel) which can help users to easily access moodboards of other spaces in the house. This can help them to easily see what style they have chosen for the rest of the rooms in the house to design in harmony. To give a sense of where the users are, the room is highlighted with a coloured border.

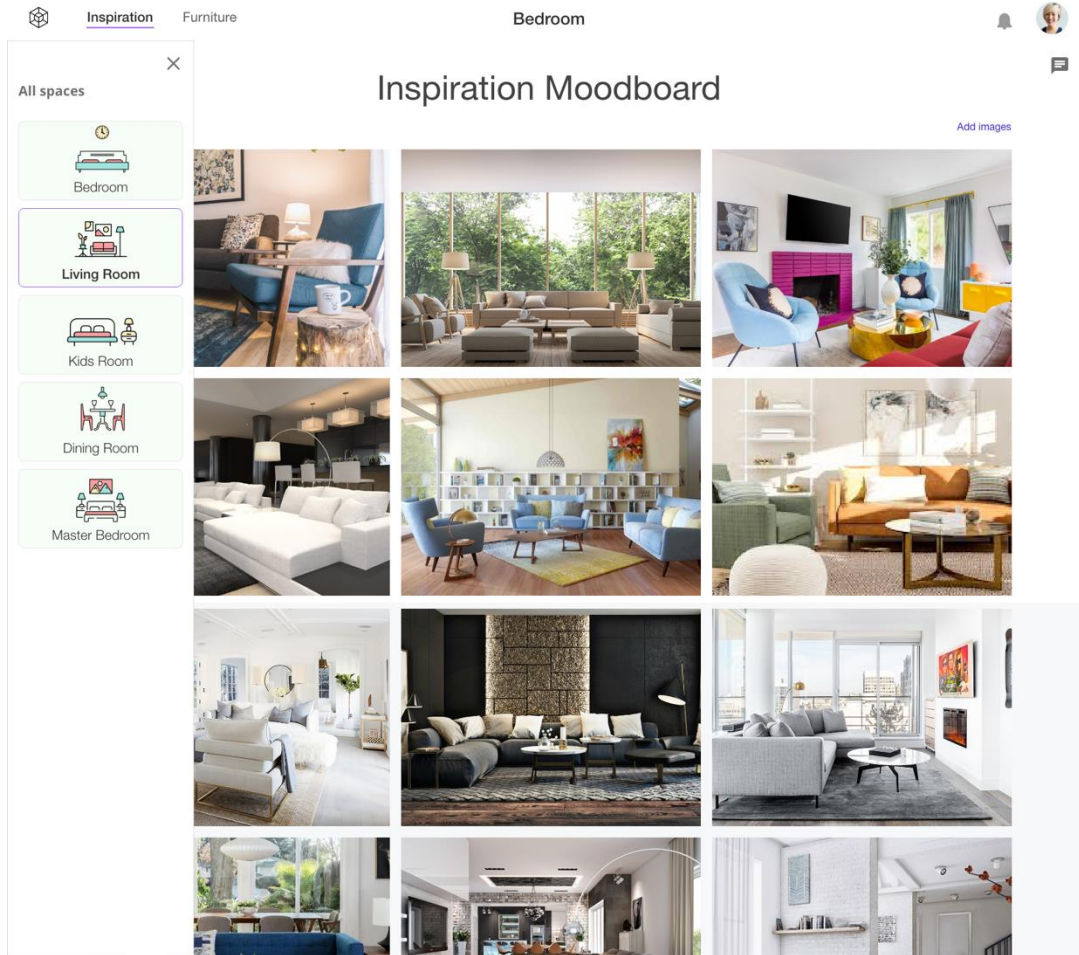


Figure 4-11. Toggle between spaces (Images in the web app design have been taken from multiple sources on Google)

### Notes and Activities (Figure 4-12, 4-13)

The user also has the option to add notes. If other collaborators on the same project are adding images, the user will receive the notifications and can see all the activities in the activity panel.

The user can open the notes and activity panel by clicking the icon on the right. The panel is expandable instead of fixed on the screen, as it is not required all the time. In this way, the mood board, which is the primary feature of the app, can have maximum screen space.

In the activity section, the user can activate the pin to drop it on any image while asking for feedback from the collaborators of the project. This again enhances the engagement process between the collaborators (#Goal 3).

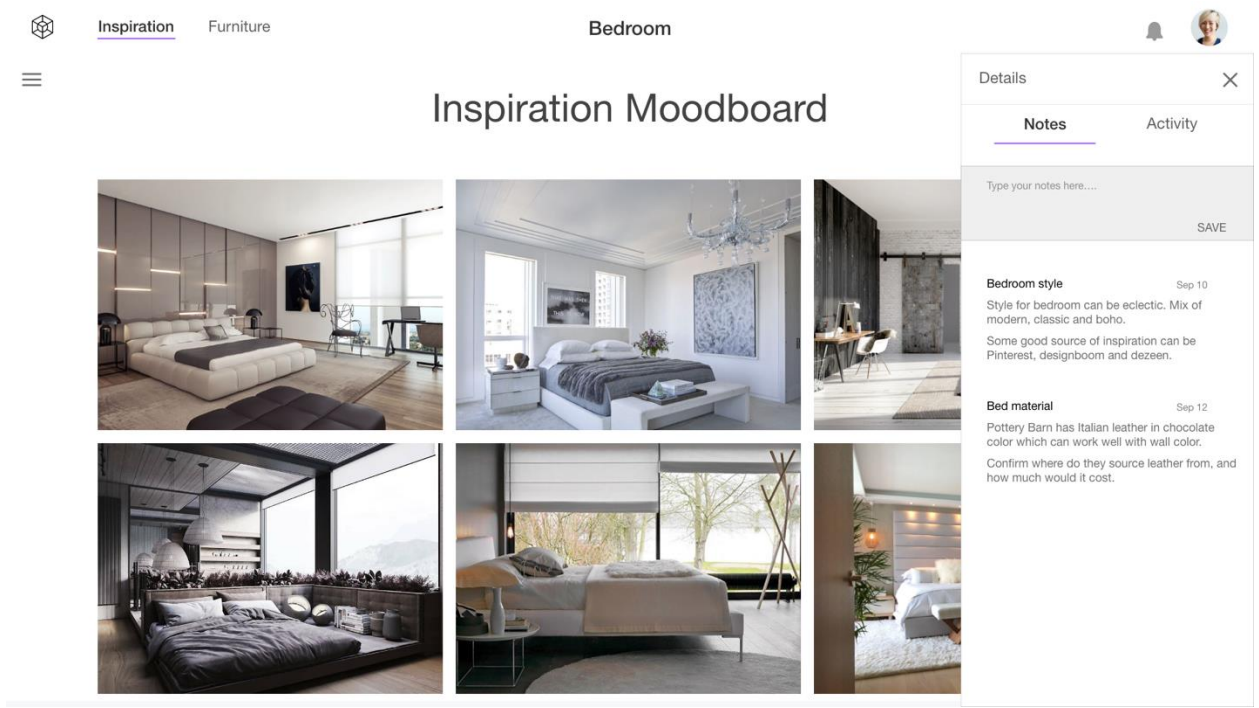


Figure 4-12. Notes (Images in the web app design have been taken from multiple sources on Google)

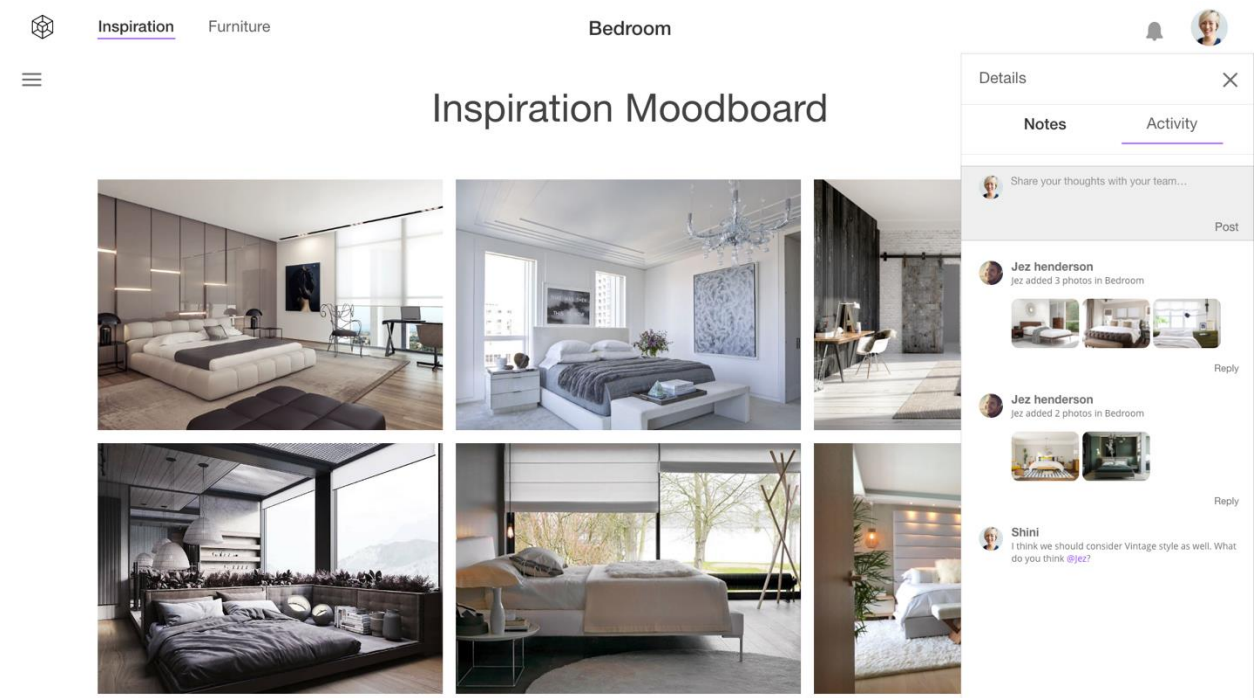


Figure 4-13 Activity (Images in the web app design have been taken from multiple sources on Google)

# Furniture board

Once the users complete the inspiration board, they can proceed to create a furniture board whenever they plan to purchase furniture.

## Selecting furniture tags (Figure 4-14, 4-15).

The users can select all the furniture items they are planning to buy. This will help the users filter various options later on in the process

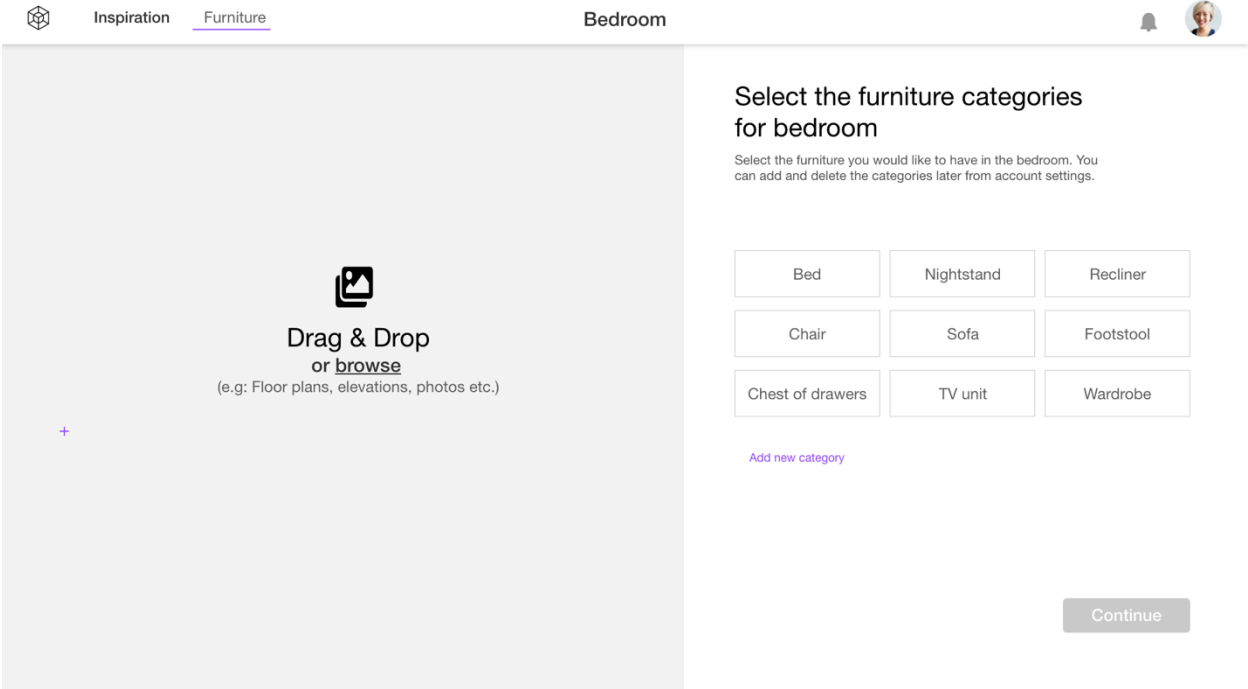
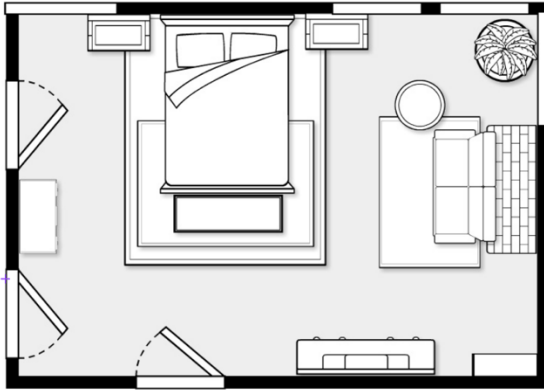


Figure 4-14. Furniture selection tags





### Select the furniture categories for bedroom

Select the furniture you would like to have in the bedroom. You can add and delete the categories later from account settings.

Bed	Nightstand	Recliner
Chair	Sofa	Footstool
Chest of drawers	TV unit	Wardrobe

[Add new category](#)

Continue

Figure 4-15 Furniture categories selected

Instead of asking the users to manually input the requirements, I have provided furniture tags to select from. The recognition rather than recall rule from Heuristics evaluation has been followed here [33]. This will reduce the cognitive load on the users, and they can quickly proceed to the next screen.

### Adding reference files

I have provided the option for users to add any reference files like floor plans, furniture layout. This can help users to understand the types of furniture they want for a particular room. The reference files will be stored in the document folder of the project which can be accessed from the side panel on the home page (#Goal 1).

### Add images to furniture board

The furniture board is designed similar to the inspiration board to maintain the consistency in the app (Figure 4-16).



Figure 4-16. Furniture moodboard

The user can add images to the board in various ways such as from inspiration board, from websites or from a mobile app using the phone's camera.

#### **Adding images while browsing online using Spaces Clipper** (Figure 4-17, 4-18, 4-19, 4-20)

According to primary and secondary research, the majority of people browse online to research for furniture. Therefore, Spaces Clipper can play a very important role in their browsing experience. Users can use Spaces Clipper to add the furniture selections in the furniture board as Spaces Clipper allows users to directly save all the information in the web app. This will save significant time for the user.

All the essential information required by users when selecting furniture (found in primary and secondary research) has been added to the Spaces Clipper. This includes saving the image, the type of furniture, its cost, and the website. This can help users analyze and compare various furniture options using filters (described in the next section).

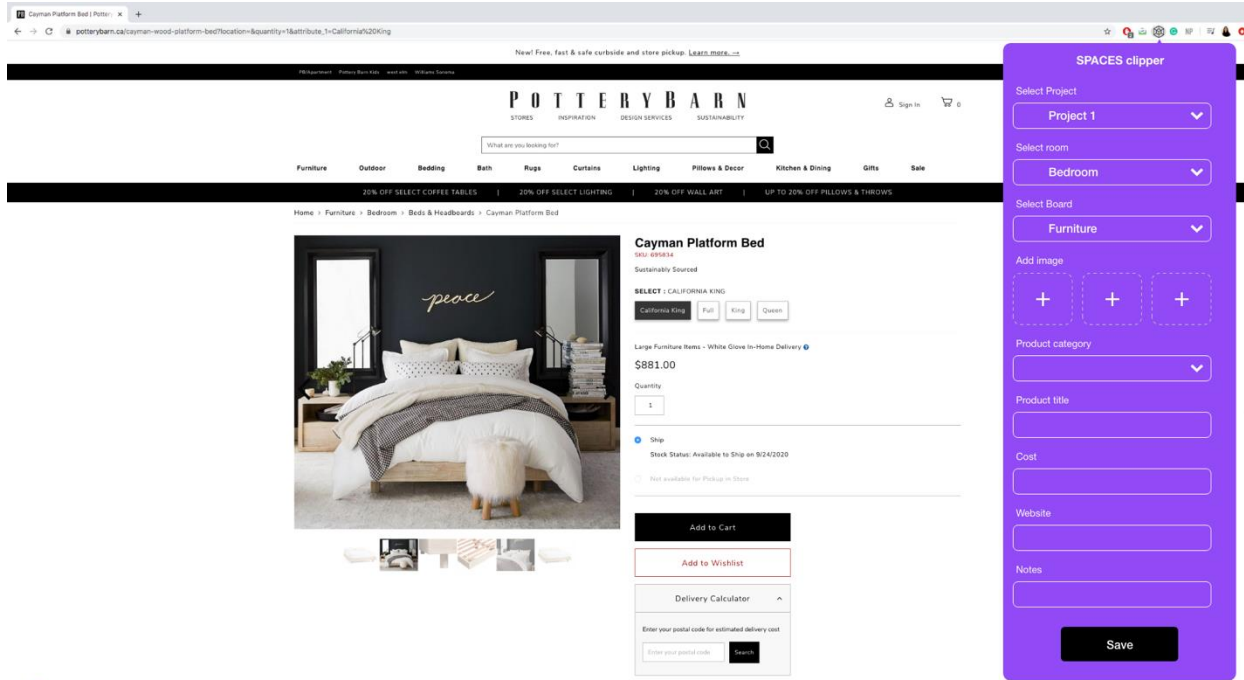


Figure 4-17. Spaces Clipper for furniture moodboard (Image inside the web app design has been taken from Pottery Barn)

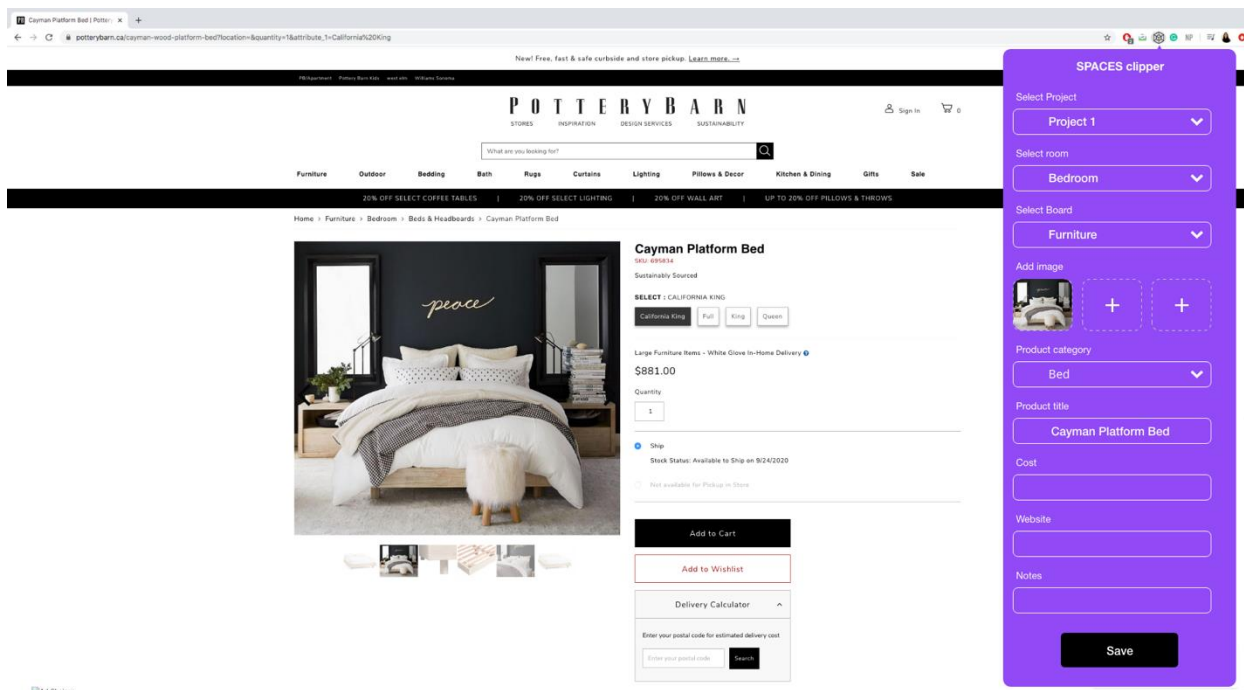


Figure 4-18. Spaces Clipper for furniture moodboard with details. (Image inside the web app has been taken from Pottery Barn)

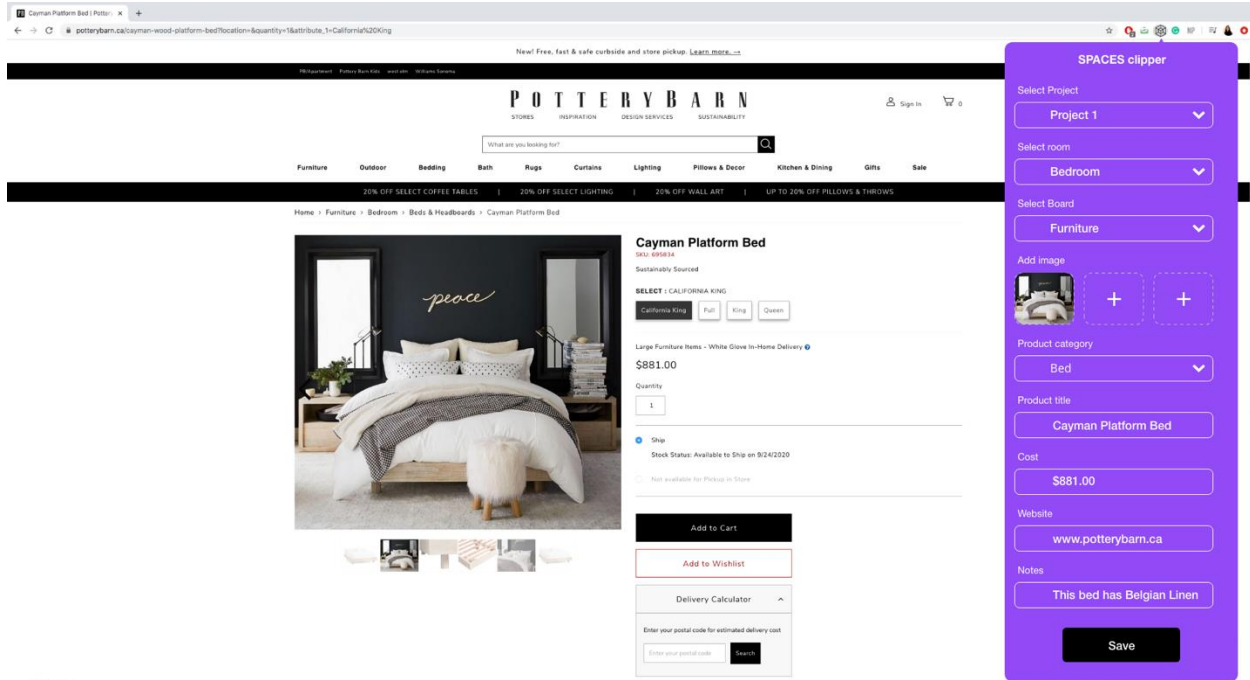


Figure 4-19 Spaces Clipper for furniture moodboard with details. (Image inside the web app has been taken from Pottery Barn)

Once the users repeat this for all the furniture selections, all the images will directly be added to their furniture board (Figure 4-20).

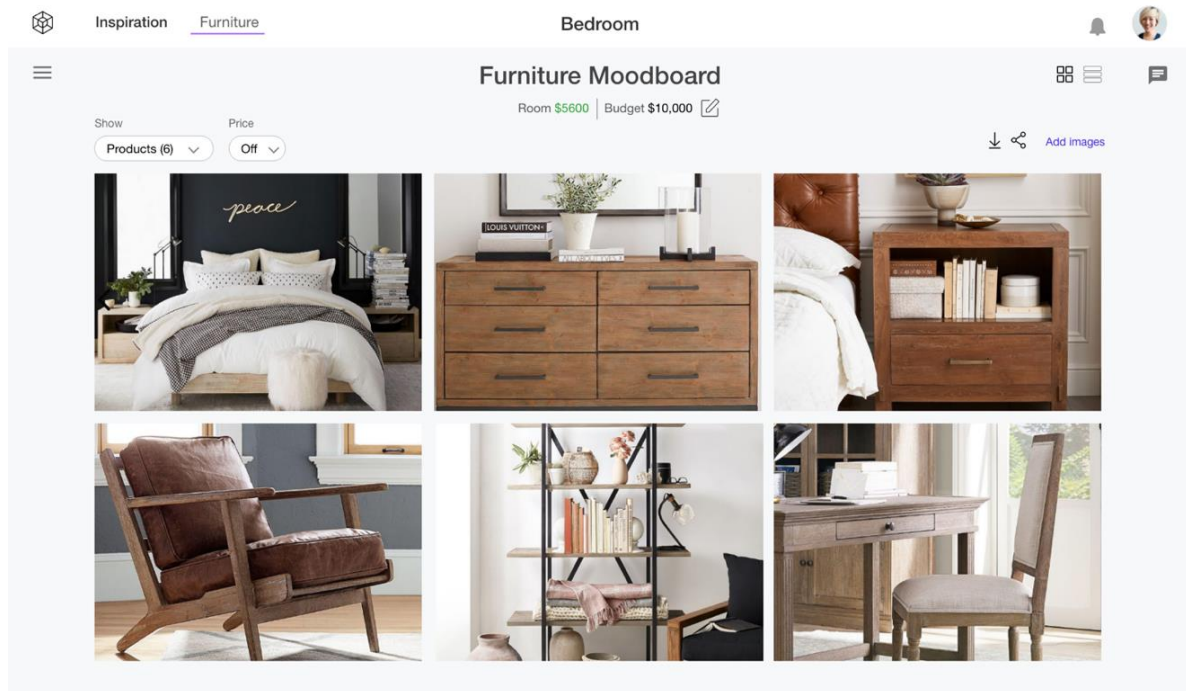


Figure 4-20. Furniture moodboard with images. (Images inside the web app have been taken from Pottery Barn)

## Enlarging and matching furniture with the rest of the furniture

Another problem that was found during the primary and secondary research was that users face a hard time visualizing furniture from multiple stores. To help them visualize better, multiple options are provided.

Once a user has added furniture selections to the furniture board, they can adjust the size as per their requirements (Figure 4-21). There are 3 scales of adjusting the size such that users can adjust the size to see everything in an appropriate proportion (#Goal 2).

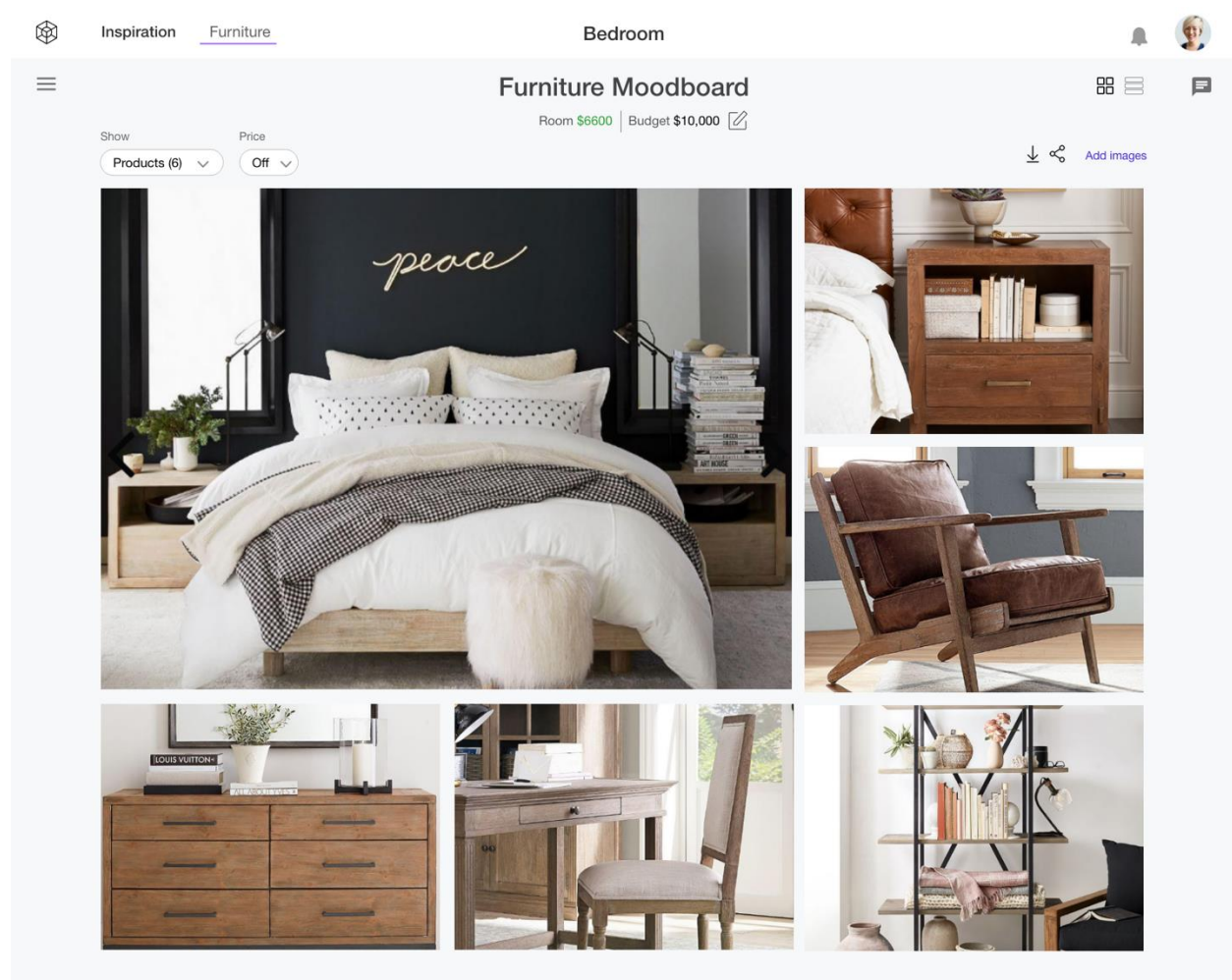


Figure 4-21. Furniture moodboard: Image size options. (Images inside the web app have been taken from Pottery Barn)

**Match style with the rest of the furniture** (Figure 4-22, 4-23, 4-24)

During the research, the users mentioned that they struggle in selecting from multiple furniture options of the same category (e.g. bed). To help them visualize options of one furniture category with other furniture categories, furniture tags have been provided. When a user adds furniture to their furniture board, with the same tags (category), all the furniture with the same tag will be in the same frame and can be seen with the left and right arrows. This will allow users to see multiple combinations of furniture. (#Goal 2).

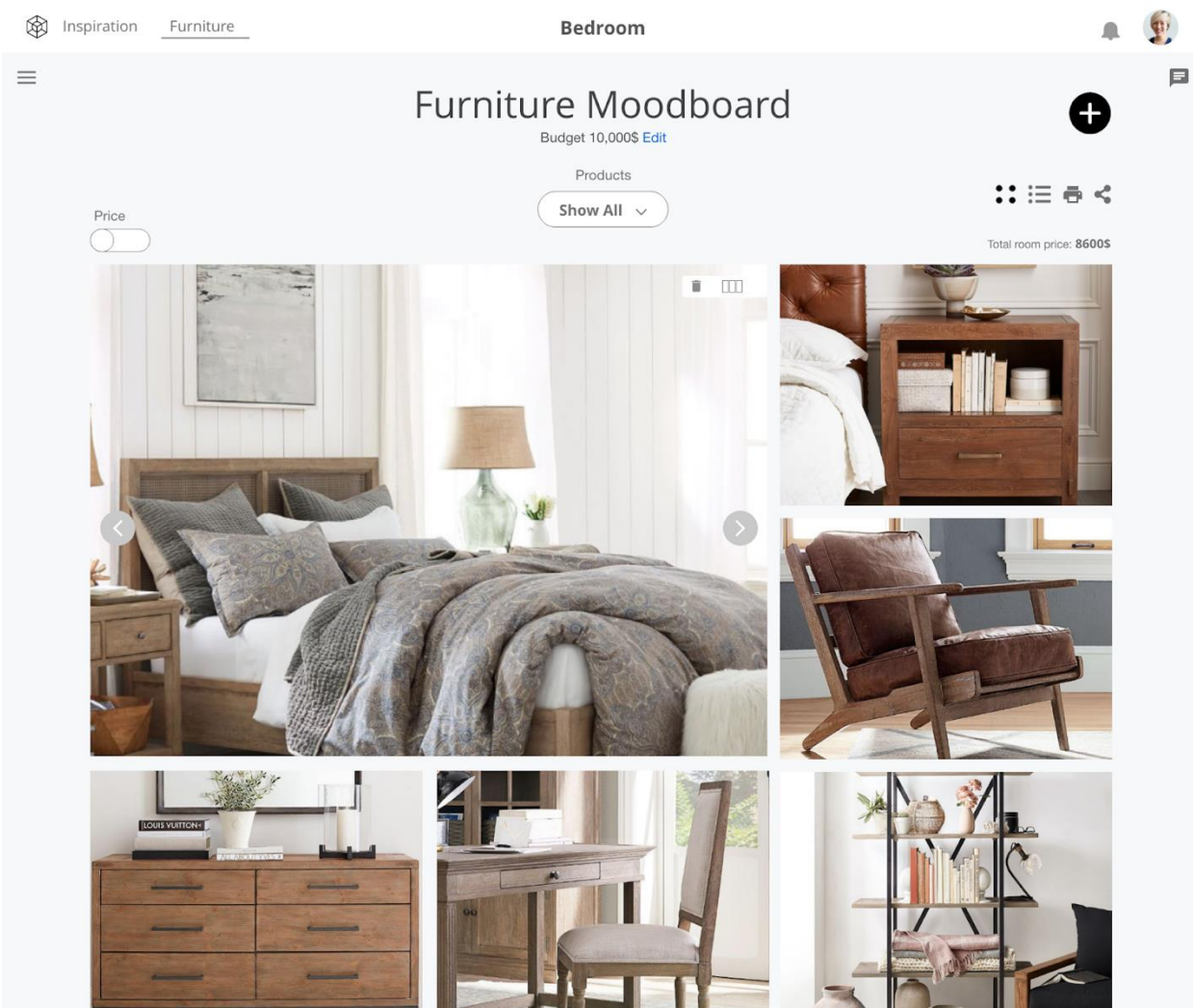


Figure 4-22. Furniture moodboard: Multiple furniture options. (Images inside the web app have been taken from Pottery Barn)

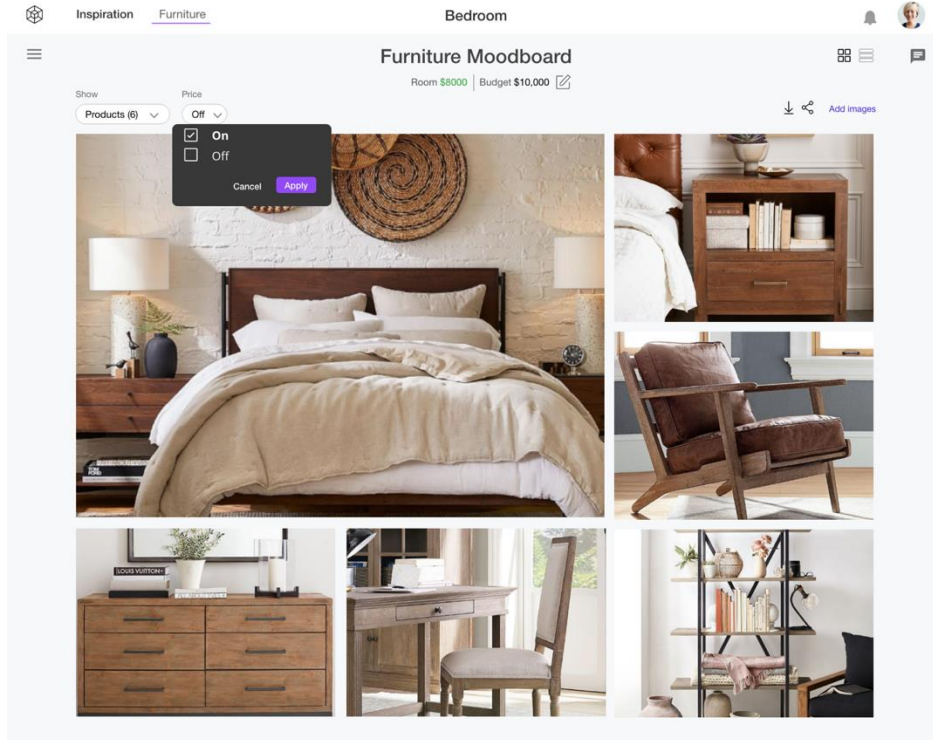


Figure 4-23 Furniture moodboard: Multiple furniture options and price filter.  
(Images inside the web app have been taken from Pottery Barn)

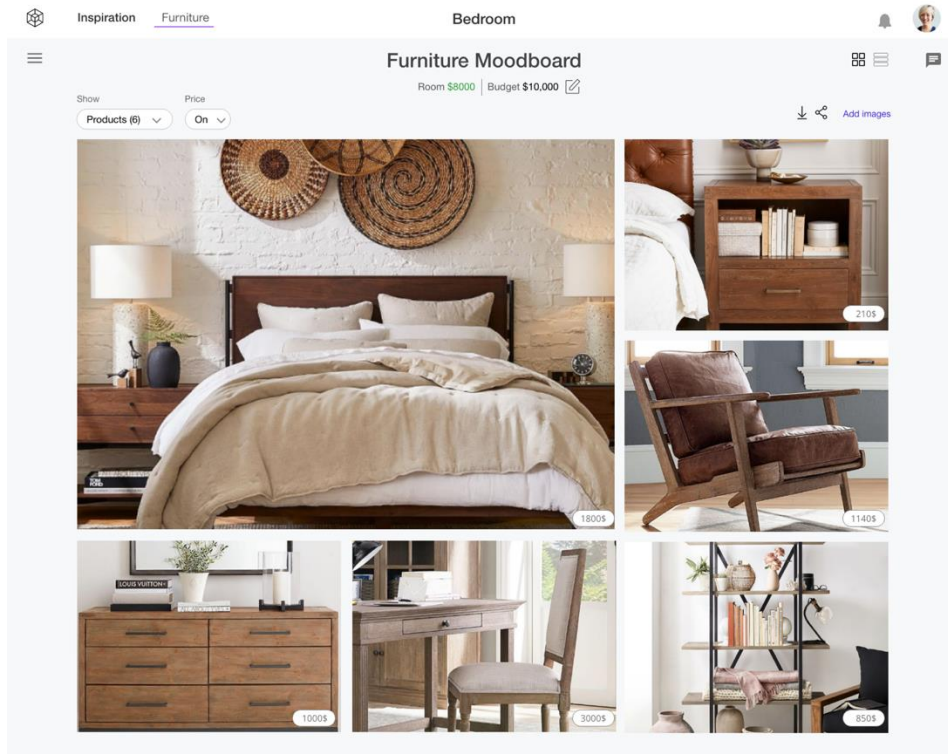


Figure 4-24 Furniture moodboard: Multiple furniture options with prices.  
(Images inside the web app have been taken from Pottery Barn)

## Compare single furniture (Figure 4-25, 4-26)

Users can filter which furniture category they want to see and compare with other categories. For example, if they only want to see the beds, they can choose beds from the filter and will be able to compare all the beds next to each other. They can turn the price on if they want to compare based on pricing. This level of visualization can help shoppers gain more confidence as they can analyze all the information quickly and efficiently before making a purchase (#Goal 2). This can also help reduce buyer's remorse. On the other hand, if the users become confident in what they want to order, it will keep them away from ordering multiple options of the same furniture category and returning the unwanted options. This again can help reduce return rates and can be beneficial for retailers.

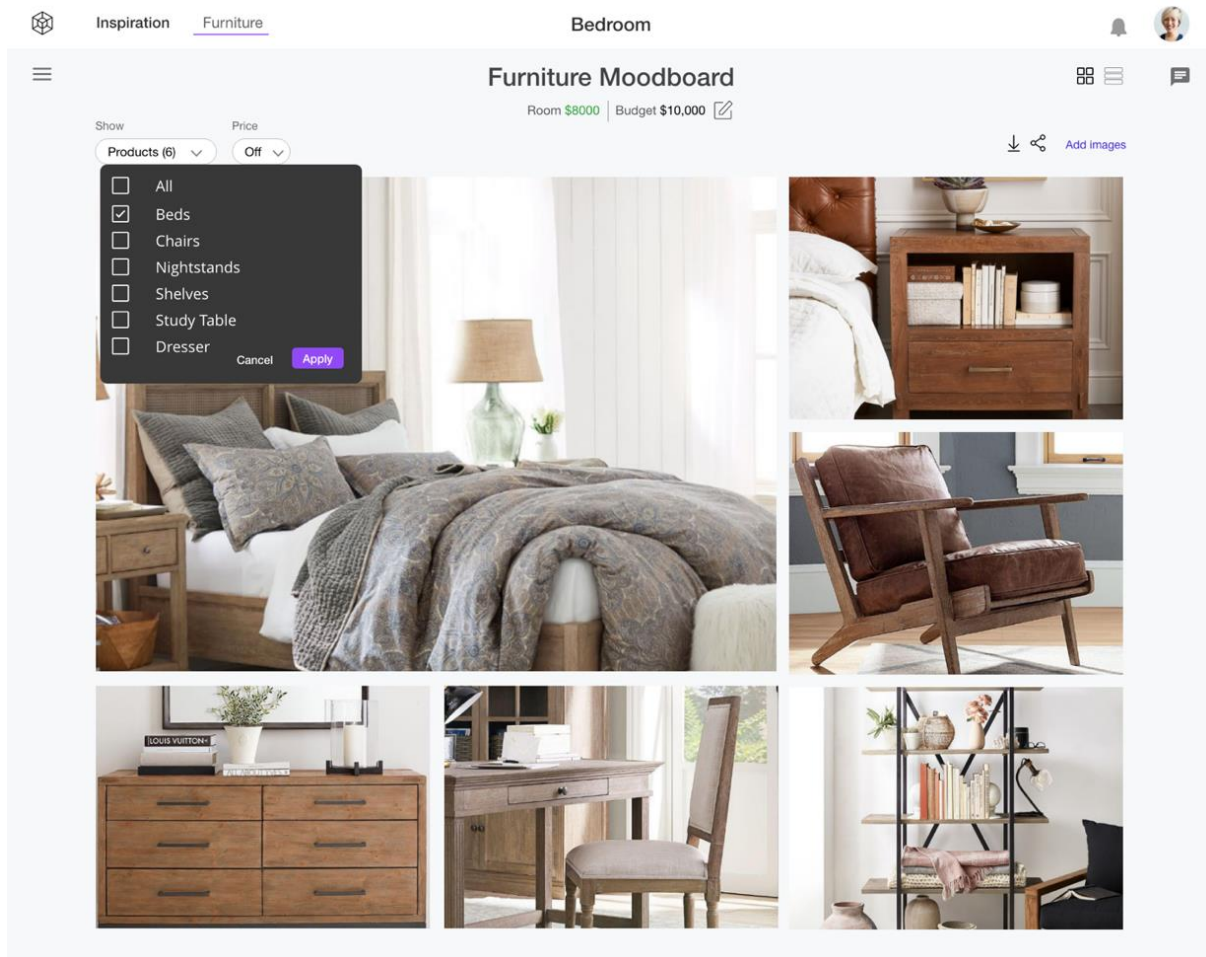


Figure 4-25. Furniture moodboard: filters. (Images inside the web app have been taken from Pottery Barn)



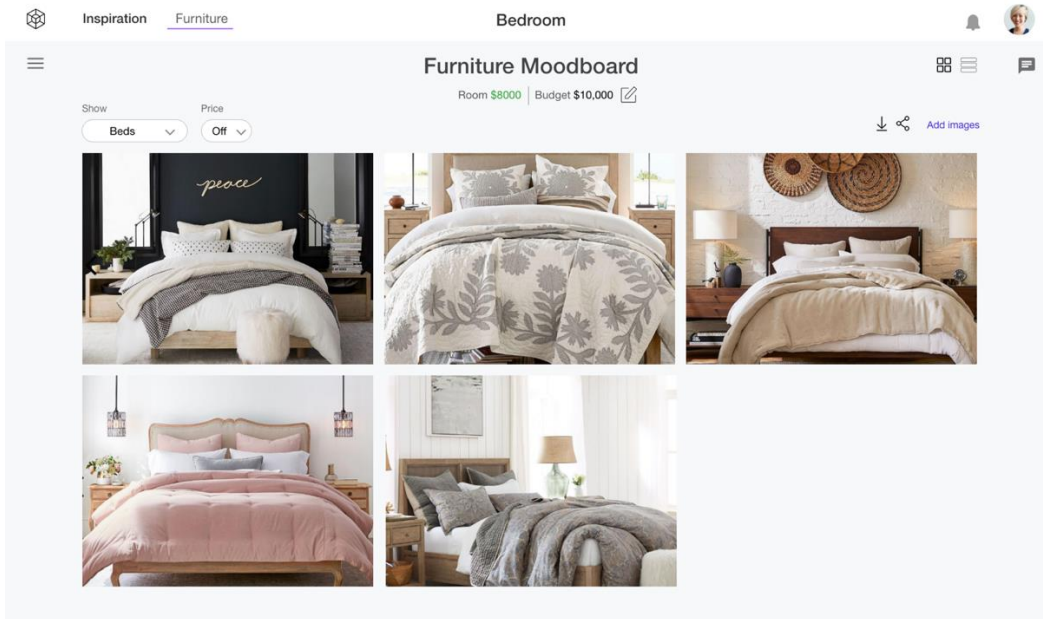


Figure 4-26 Filter applied. (Images inside the web app have been taken from Pottery Barn)

### Sharing with friends/family (Figure 4-27, 4-28, 4-29, 4-30)

In my primary and secondary research, it was found that users seek opinions from others when it comes to buying expensive products like furniture. Even while collaborating on a project with a person, the majority of the users prefer to seek more opinions or feedback from various people.

In Spaces web app, users can share the link with other people by clicking on the share icon.

Users have the option to turn the pricing on/off and customize the moodboard in various ways.

This will give the users freedom or control of what is being shared with other people (Figure 4-27).

Once another person opens the link in their browser, that person can add comments either as a guest or can sign in with the spaces app. The guest option is provided to make it easier for people to make comments (#Goal 3). Guests who are also interested in shopping for furniture may opt to sign in with the app, which will increase app usage and mobile app downloads (Figure 4-29).

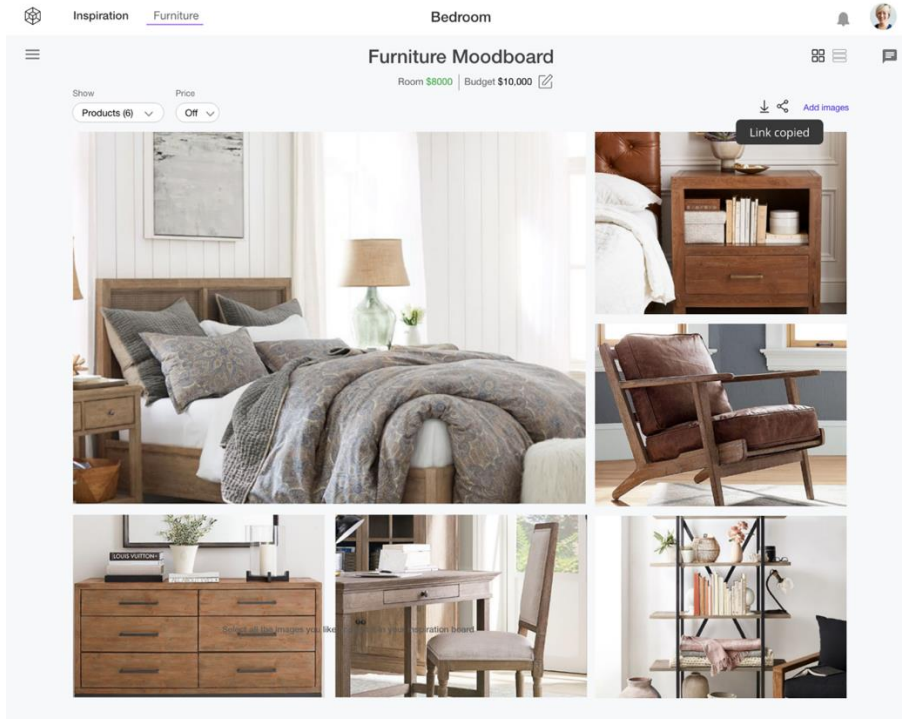


Figure 4-27. Furniture moodboard: Link sharing. (Images inside the web app have been taken from Pottery Barn)

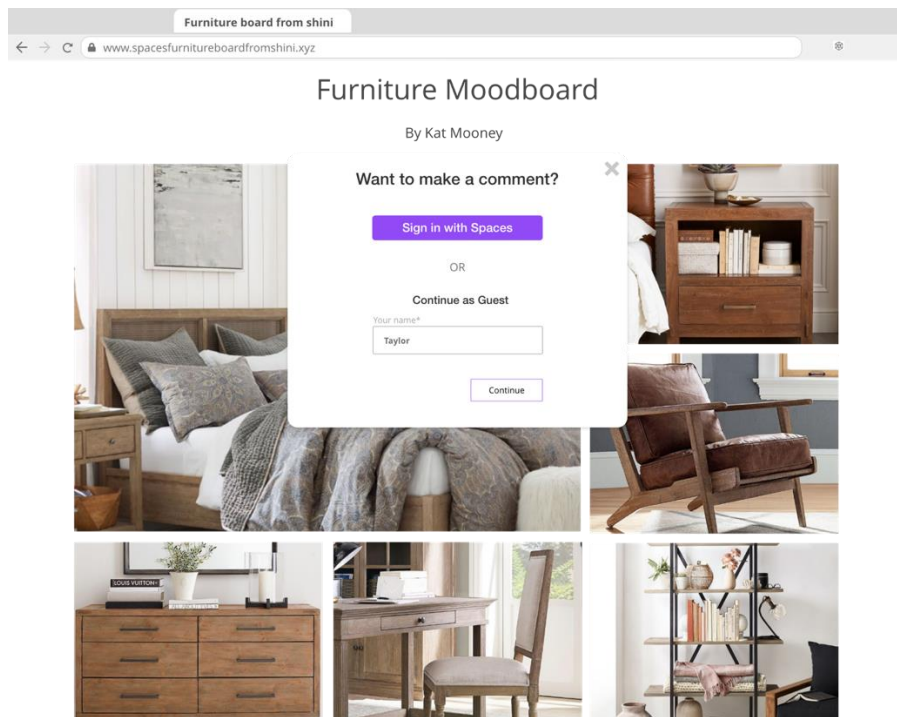


Figure 4-28. Furniture moodboard: Guest commenting option. (Images inside the web app have been taken from Pottery Barn)

The other person can mark the furniture using the drop pin option. This will help the app user understand what exactly is being commented on (Figure 4-29).

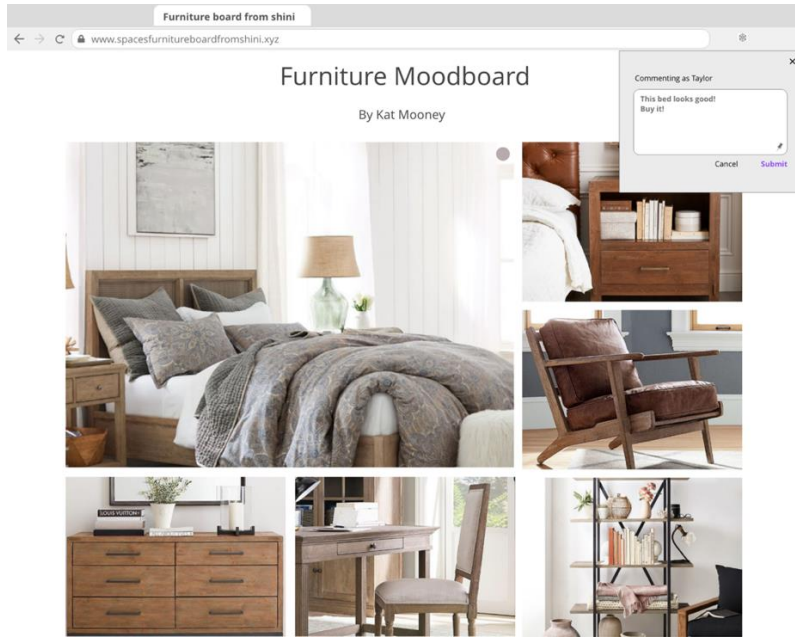


Figure 4-29. Guest comment. (Images inside the web app have been taken from Pottery Barn)

Once the other person submits the comment made on moodboard, the user will receive a notification in the activity panel of the web app (Figure 4-30).

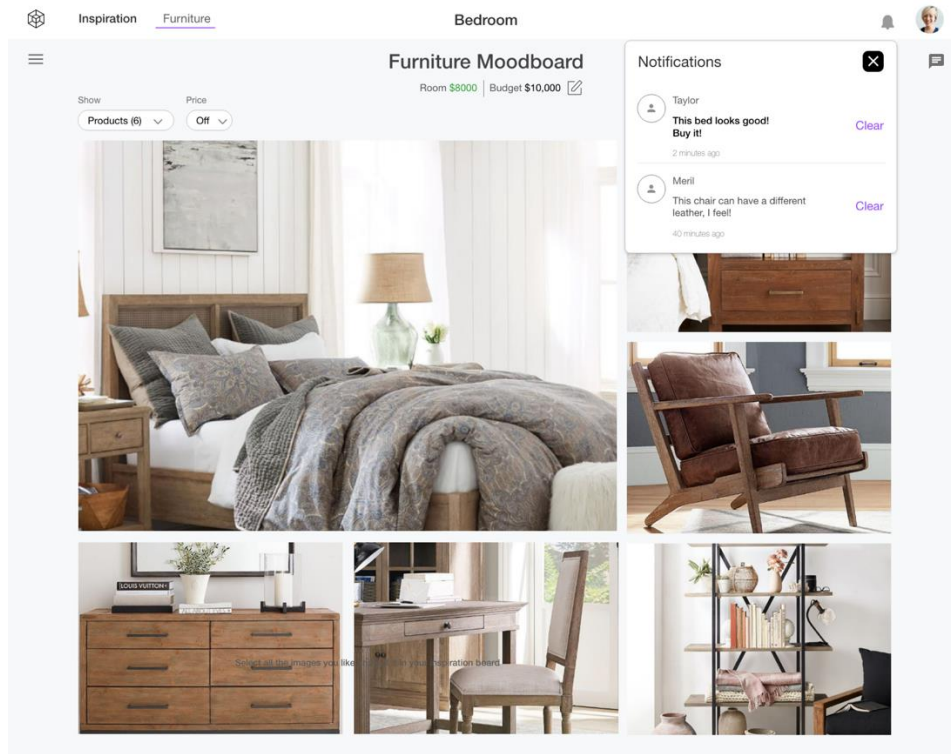


Figure 4-30. Furniture moodboard, sharing, notifications. (Images inside the web app have been taken from Pottery Barn)

## Details

The users have the option to see all the details regarding the room in the detail view (#Goal 1). They can mark items as purchased if they plan to purchase. They can also modify other details like type, price, and website. They can add or edit notes here. The budget option is given on top of this page to keep the users aware of their expenditure. This will also help them analyze their priorities when it comes to purchasing furniture. They can decide what can be purchased now and what can be purchased later. This will adjust their expenses accordingly in the budget tracker, which will also be reflected on the home page. (Figure 4-31).

The screenshot displays a 'Furniture Moodboard' for a 'Bedroom'. At the top, there are navigation tabs for 'Inspiration' and 'Furniture', and a 'Bedroom' header. A budget summary shows '3 Items purchased' for '\$3,150' out of a '\$10,000' budget. Below this, the 'Selected furniture (6)' section contains a table with the following data:

Product Image	Name	Type	Price (USD)	Website	Notes	Purchased?
	Cambella	Bed	1800	abcxyz.com	<a href="#">View notes</a>	<input checked="" type="checkbox"/>
	Beril	Nightstand	210	abcxyz.com	<a href="#">View notes</a>	<input checked="" type="checkbox"/>
	Noora	Chair	1140	abcxyz.com	<a href="#">View notes</a>	<input type="checkbox"/>
	Cambri	Dresser	1000	abcxyz.com	<a href="#">View notes</a>	<input checked="" type="checkbox"/>
	Luisan	Study table	3000	abcxyz.com	<a href="#">View notes</a>	<input type="checkbox"/>
	Mujrey	Shelves	850	abcxyz.com	<a href="#">View notes</a>	<input type="checkbox"/>

Below the 'Selected furniture' section is the 'More furniture (20)' section, which includes the following items:

Product Image	Name	Type	Price (USD)	Website	Notes	Purchased?
	Rollyn	Bed	2800	abcxyz.com	<a href="#">View notes</a>	<input type="checkbox"/>
	Camir	Bed	2300	abcxyz.com	<a href="#">View notes</a>	<input type="checkbox"/>

Figure 4-31. Furniture moodboard: Detail view. (Images inside the web app have been taken from Pottery Barn)

## Dashboard

Once the user completes the purchase, the room card on the dashboard will get updated automatically according to the amount spent in making purchases and the amount left from the budget (#Goal 1). The total number of items the users purchased will also be reflected on this card. The items can be viewed directly by clicking on the number of items purchased (Figure 4-32).

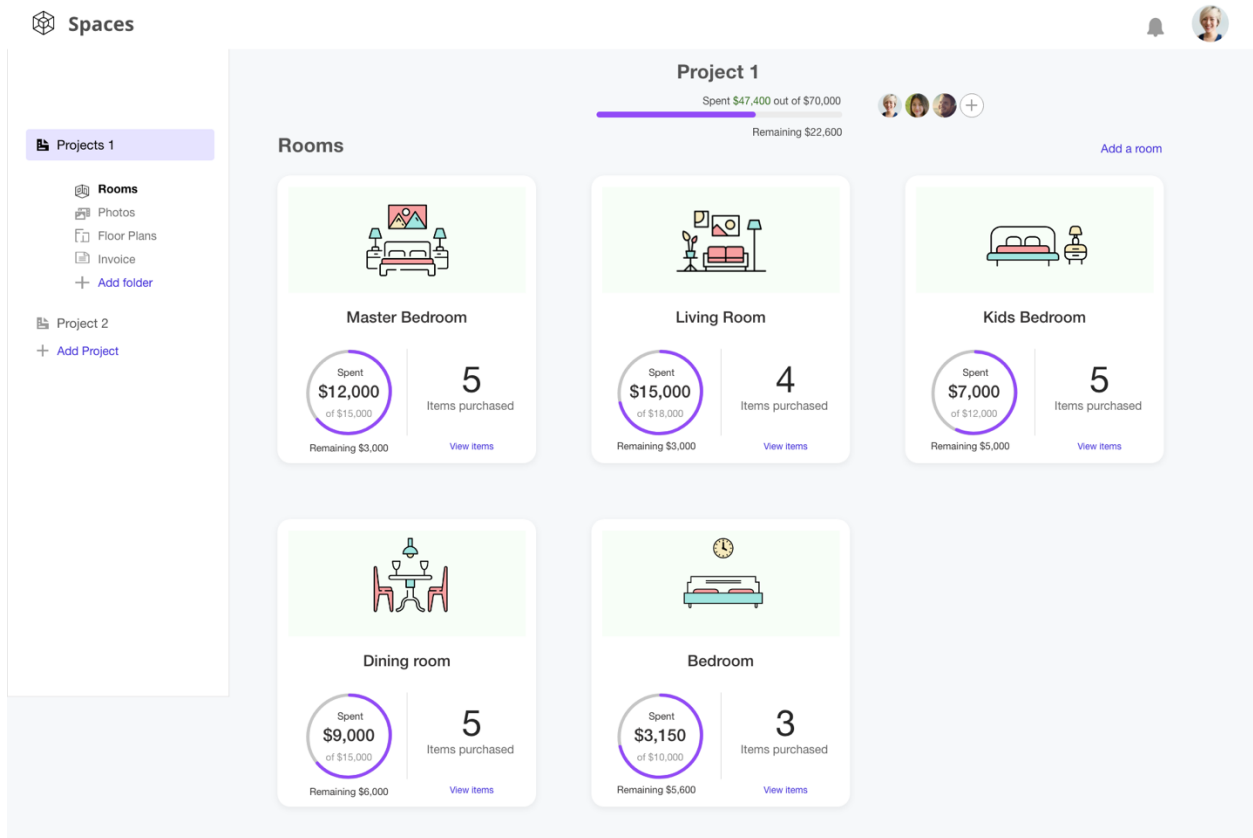


Figure 4-32 Dashboard after the purchase has been made

## **Redesigning after user's feedback**

Based on the feedback I received from the users after discussing the high-fidelity prototype with them, I decided to make some changes in two main features of the design: Spaces Clipper and Moodboard filter.

### **Spaces Clipper: Manual data entry**

While designing the Spaces Clipper, I made all the text fields to be filled automatically once the users hover and click on the data on the website after clicking on the respective text fields in the Spaces Clipper. I assumed that it would make it easier for users to add the details of the respective fields with just one click without having to write everything manually. Therefore, I did not give any features to help the users add details manually.

However, after taking feedback from the users, I realised that the users actually want the ability to enter data manually as well along with the automatic data entry. Users prefer to customize the title of the product as per their preference as a lot of the website have names which are hard to recall later on. Secondly, users want to write their own notes, instead of only being dependent on the websites' product details.

Therefore, in the new design of the clipper, I added the manual data entry option. I added a plus icon next to the text fields. Only when a user clicks on the plus icon and clicks on any information on the website, the data will be entered automatically. Otherwise, users have the option to manually write everything in the text field. They also have the option to edit data which has been added automatically in the text fields.

### **Spaces Clipper: Currency**

I have limited the first version of my app to only USD and CAD currency. In the original clipper design, I had only given the option to add cost in one currency which is USD even though I had given the option to change the currency in the budget section on the dashboard (while adding a room).

After receiving feedback from the users, I added two currency options in the clipper. The currency in which the users have initially selected the budget (on the dashboard) will be considered the main currency. If the users add the cost of the product in clipper in any other currency, the amount will be converted into the original currency (similar to budget) and will be reflected in grey font above the cost field. This original currency will be displayed everywhere from moodboards to a detail view of products.

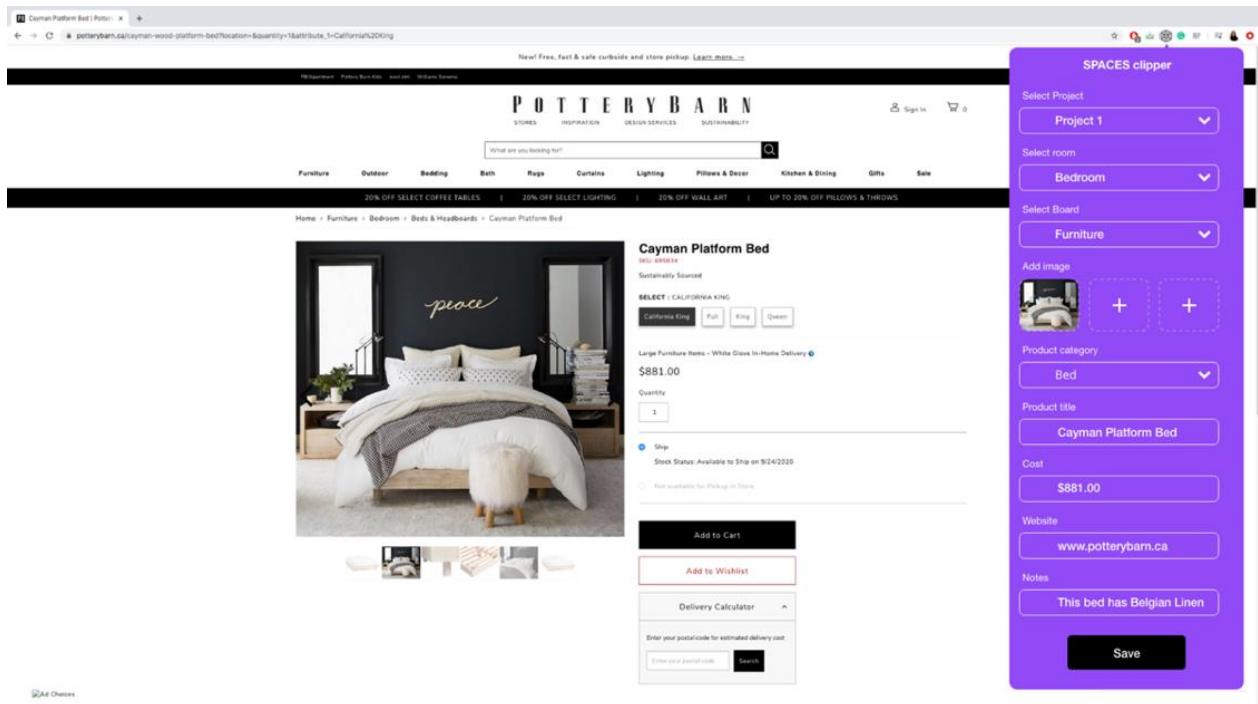


Figure 4-33 Space clipper before redesigning. (Image inside the web app has been taken from Pottery Barn)

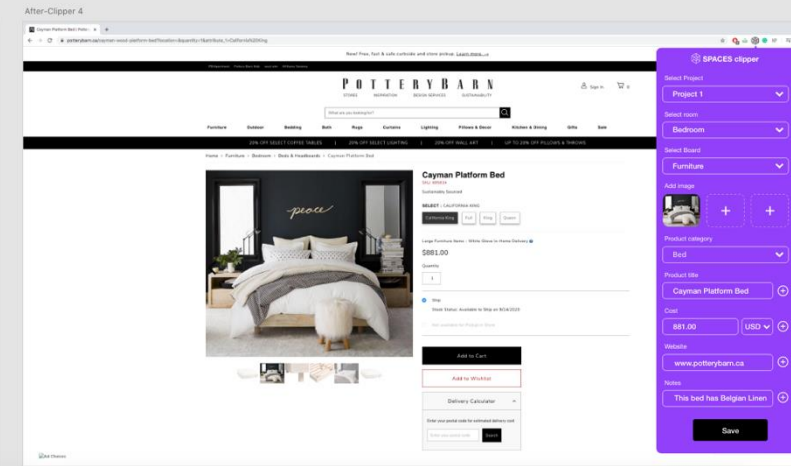
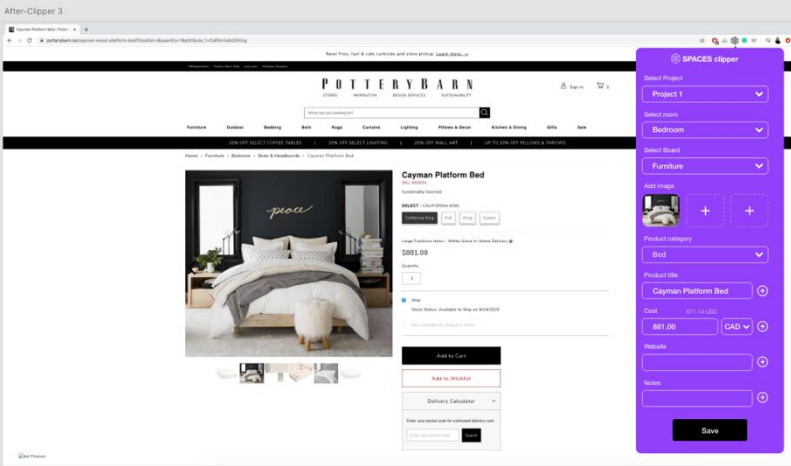
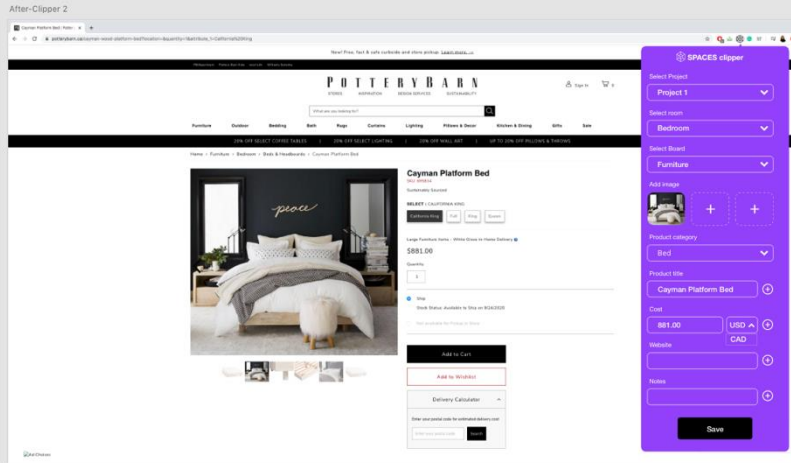
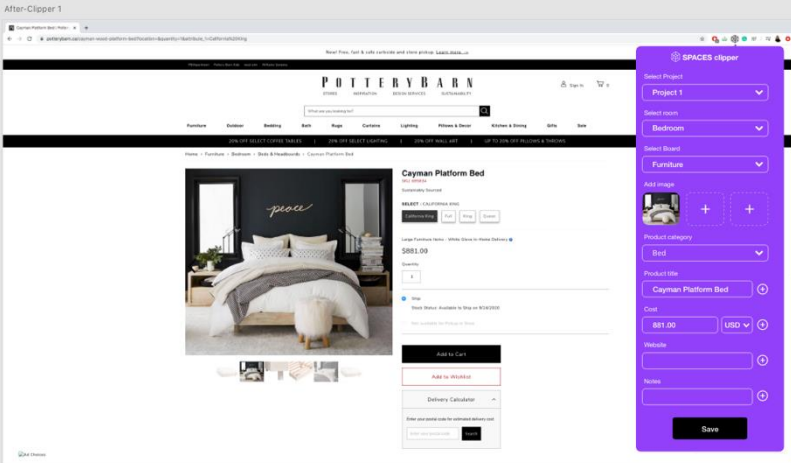


Figure 4-34 Space clipper after redesigning. (Images inside the web app have been taken from Pottery Barn)



## Moodboard filter

In the original moodboard filter, I gave the option to select furniture categories and only those furniture categories would be displayed and the room price would remain the same as what they had with all the furniture category displayed. However, later on, I realised that it would be better if I give the option to change the selection in the single category view with the room price changing accordingly in the price window on the top of the screen. This will help users to select from various options of single furniture category.

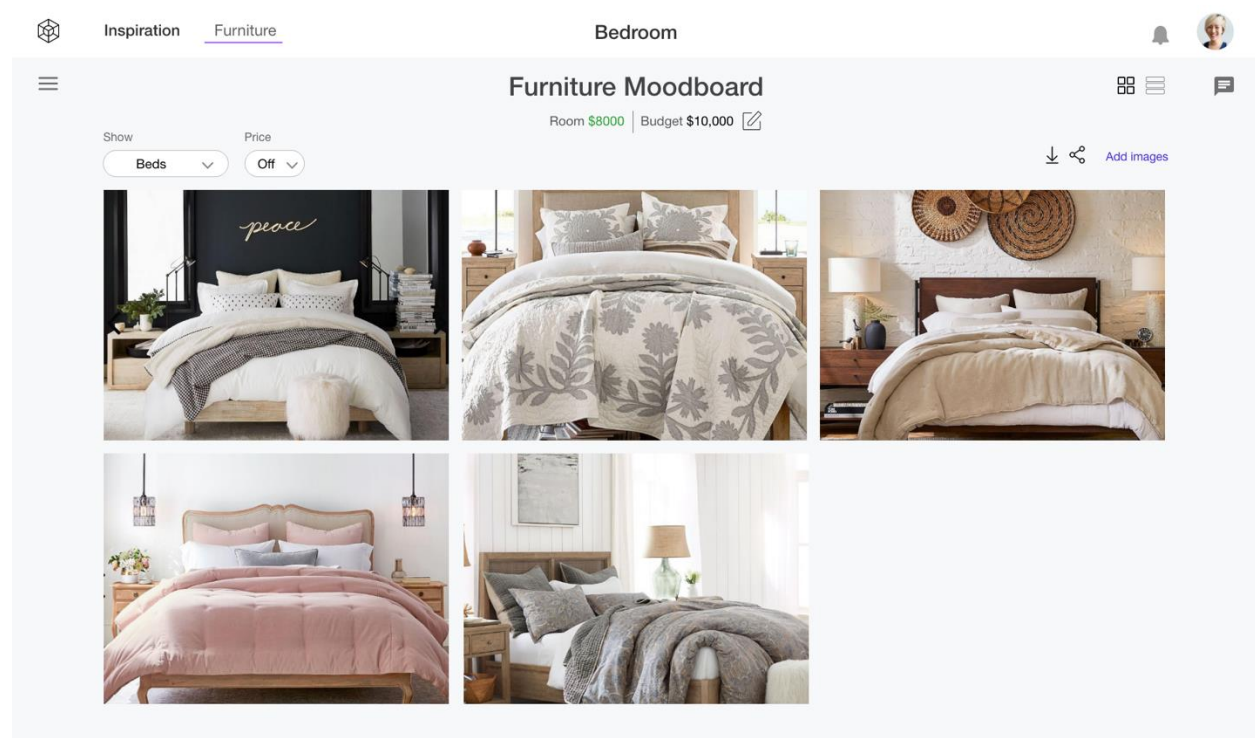


Figure 4-35 Single furniture category moodboard before redesigning.

(Images inside the web app design have been taken from Pottery Barn)

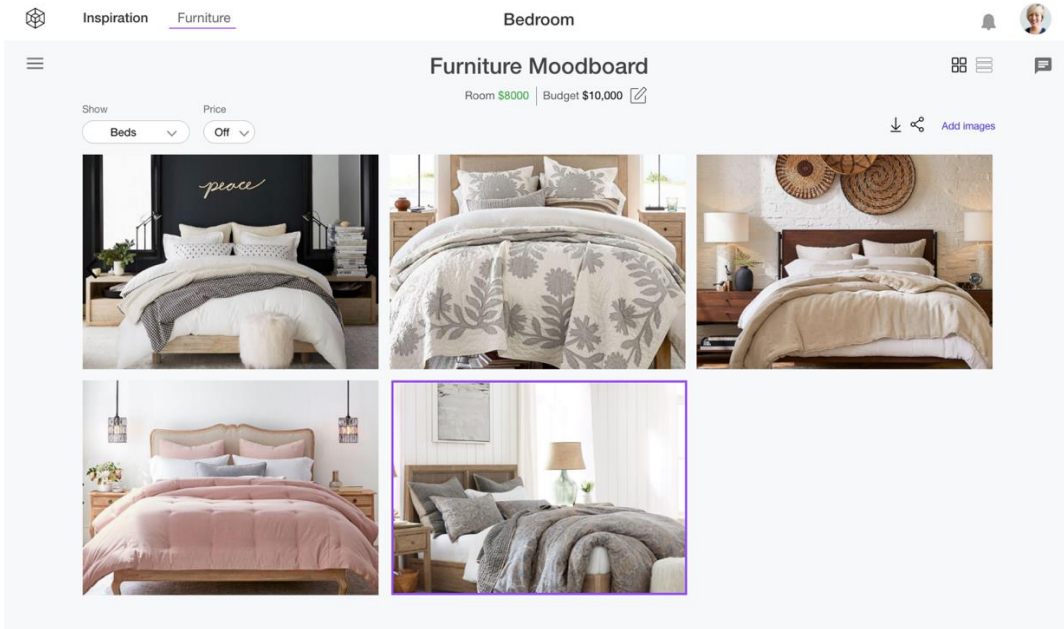


Figure 4-36 Single furniture category moodboard after redesigning  
 (Images inside the web app design have been taken from Pottery Barn)

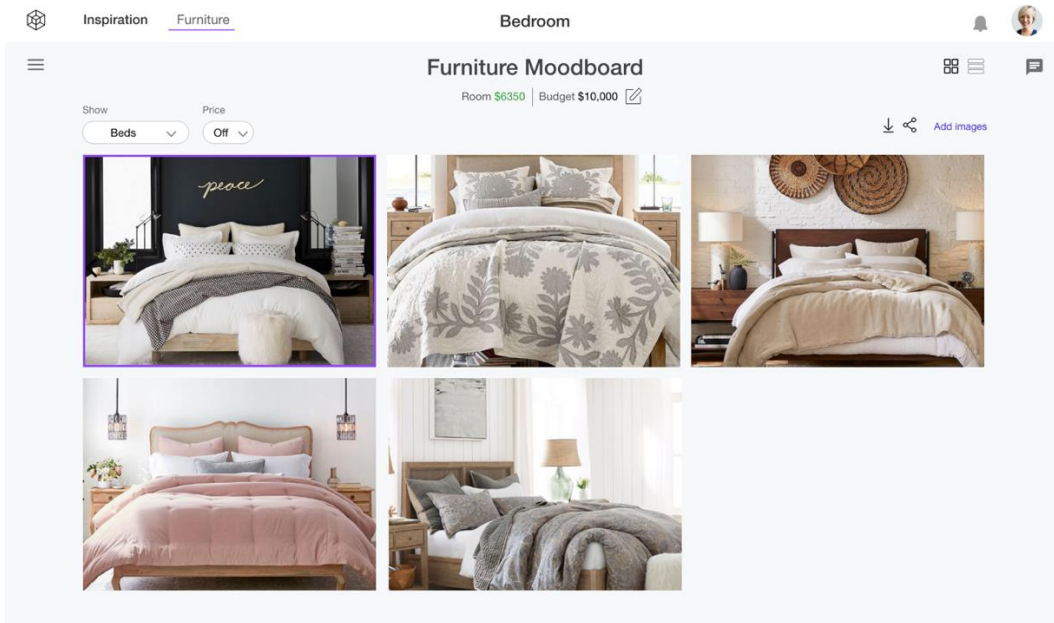


Figure 4-37 Single furniture category moodboard after redesigning.  
 (Images inside the web app design have been taken from Pottery Barn)

## **4.2 Mobile app Design**

### **User Flows**

During my research, I found that furniture shoppers use both online and offline channels to shop for furniture. They do extensive research online and visit multiple stores to touch, feel furniture, and take inspiration. Therefore, it was decided to ideate on the mobile app design flow for the users. The mobile app will have most of the features which the web app design has, to give users more flexibility to add inspiration or furniture images.

With a mobile app, users can add inspiration from wherever they are just with the use of the mobile app. The mobile app can be very useful for in-store browsing. Users can take pictures of the furniture directly from the app's camera and add details that will be saved directly in the selected moodboard. After observing the furniture shoppers during my research phase, I found out that people struggle to remember the details of the furniture they have seen in various stores and they do not have one single place to add all their notes and images of furniture. The mobile app can help them refer back to the inspiration board while they are in-store and can help them see furniture accordingly. This can help in achieving #Goal 1 and # Goal 2.

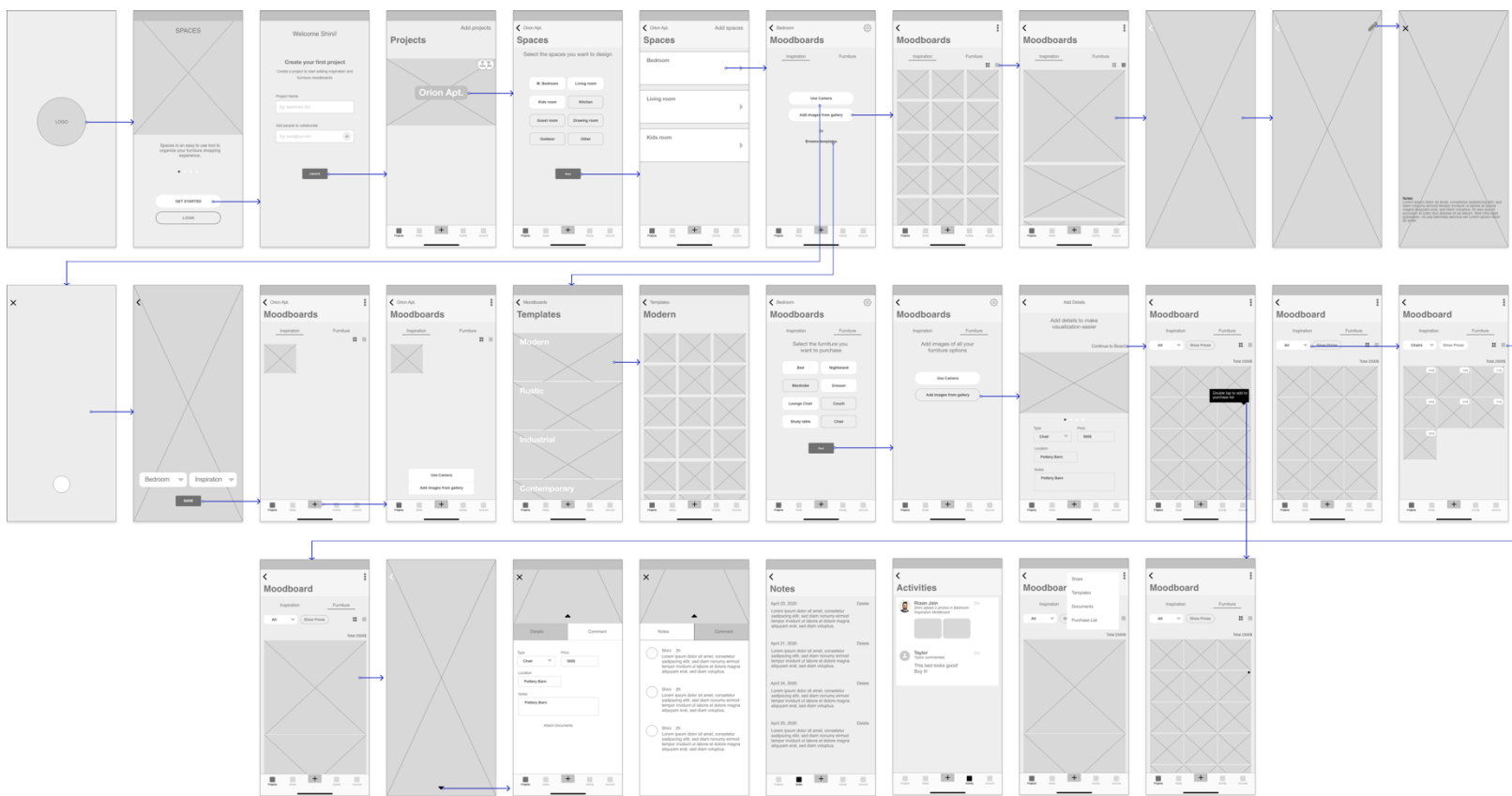


Figure 4-38 Mobile app user flow

## High fidelity mobile app screens

As most of the features in the mobile app are similar to the web app design, I decided to make the high-fidelity screen of only the camera feature as this is a feature that is not available in web app design and this can be very useful for the shoppers.

The user can click the picture of the furniture or any inspiration using the app's camera (Figure 4-39). Once the user clicks on save, the user will be moved to the next screen where the user will be asked to fill in the details of the product. The user can fill in the details and the image with the details will be saved directly in the selected moodboard (Figure 4-40).



Figure 4-39 Using Spaces mobile app camera to click picture. (Living room image from Pottery Barn)

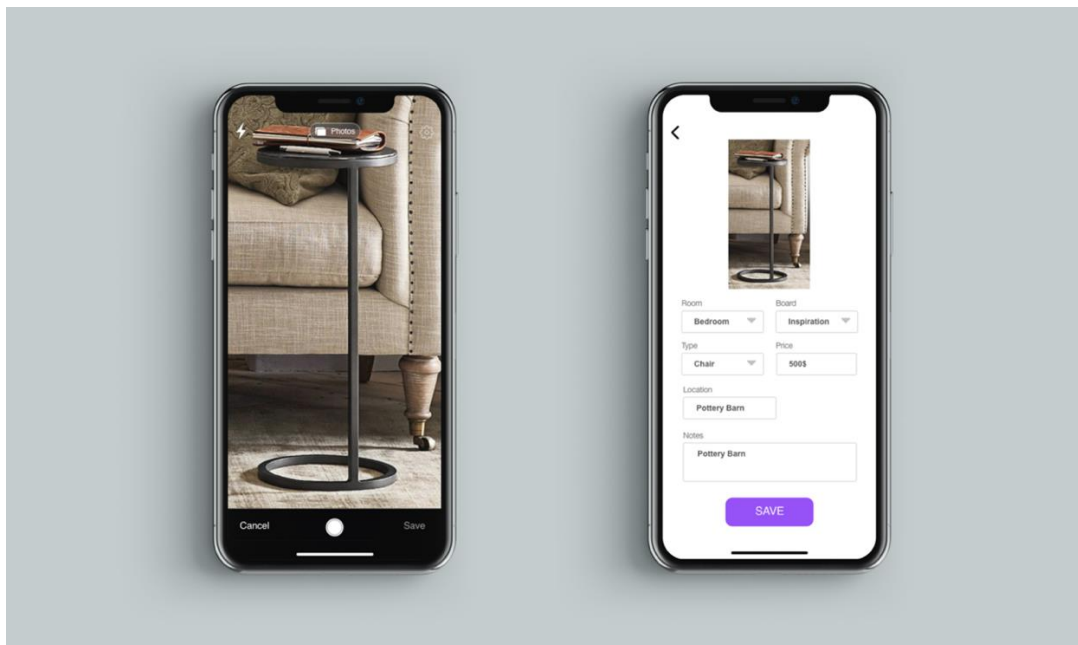


Figure 4-40 Mobile app camera and image details screen. (Living room image from Pottery Barn)

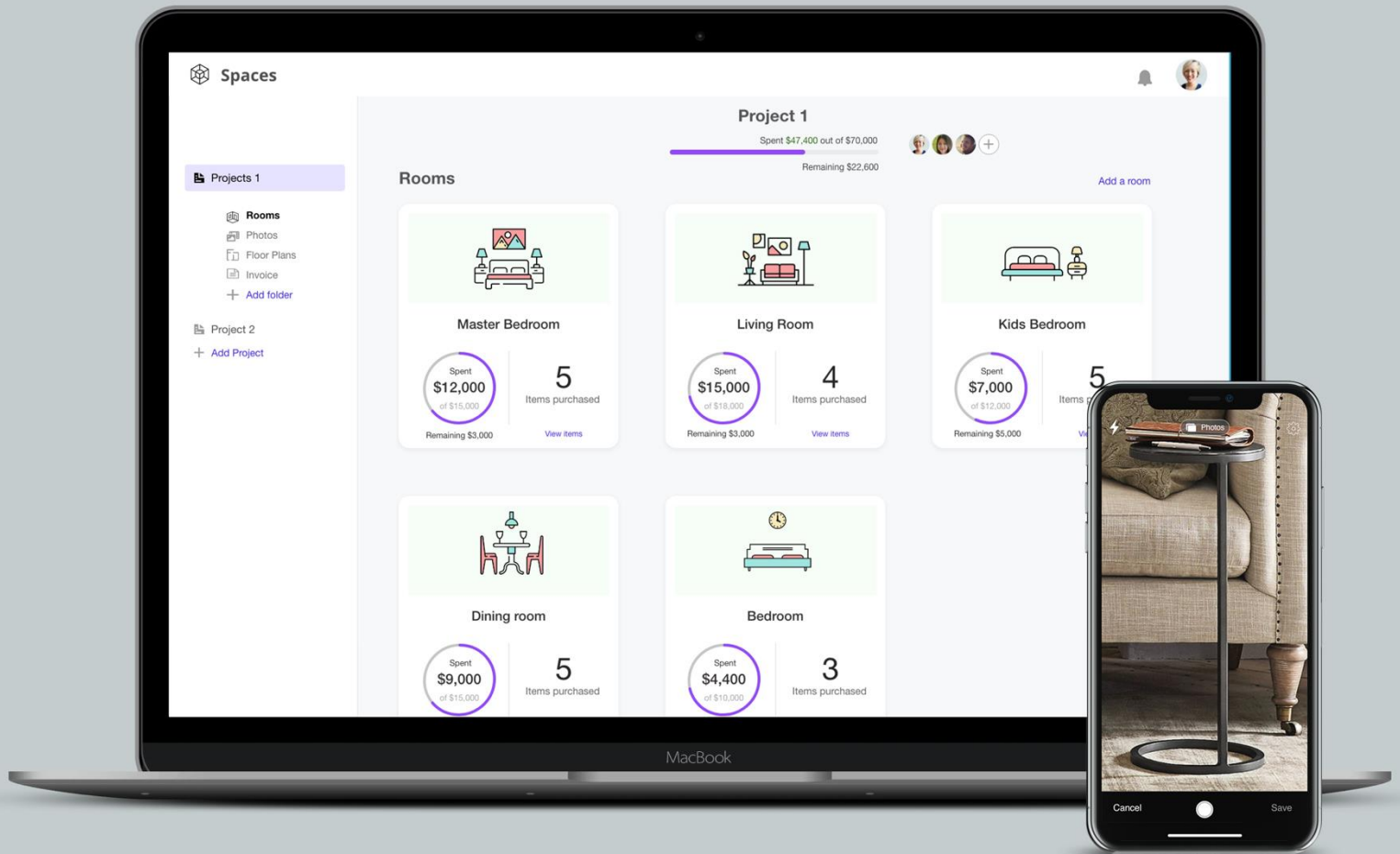


Figure 4-41 Web app and mobile app design. (Living room image from Pottery Barn)

## Chapter 5 Conclusion

### 5.1 Summary

Spaces is a product management app designed to enhance the furniture shopping experience. I conducted both primary and secondary research to understand user needs. Through the secondary research I identified the market gap, and to further validate the problem area, I conducted primary research in the form of interviews, surveys, and observations. I used various methods such as the customer journey mapping, empathy mapping, and affinity diagram to synthesize my research and categorized the design opportunities into 3 main sections: Organization, Visualization, and Collaboration. Users struggle with organizing their shopping research and selections, they find it difficult to visualize furniture in their space and they prefer to collaborate with other people to design their house.

To solve the problems, I started with writing down the solutions, and using the IBM priority graph, I selected features based on value and feasibility. I created quick sketches of these selected features and developed wireframes.

After multiple iterations and discussions with the users and my supervisor, I designed High-fidelity prototypes for the web app design and some of the screens for the mobile app.

- I designed features such as Spaces clipper which can help users organizing their browsing experience during the research phase of their furniture shopping journey and designed a dashboard to help them quickly scan through the important information they require to make selections.
- I created user-friendly inspiration and furniture moodboard spaces with features of resizing and category grouping to help users visualize various options effectively considering their budget.
- I made various features to help users collaborate with other people on the project and also receive feedback easily from non-collaborators

To conclude, I designed a mobile and web application to help people effectively organize, visualize, and collaborate when they are designing for their home project.

## **5.2 Future thinking**

Considering the timeline of the project, I narrowed the focus of my research and designed the app only for home furniture shopping. However, this application can be expanded in the future to be used for most of the furnishing and decor items required to design residential and commercial interiors.

With additional features, this application could also be used by Interior Designers, Interior Architects on industry projects to organize, visualize, and collaborate on design projects with their clients. It can become a useful tool for client-designer discussions on design projects. The professional model of my app would have the necessary features for the professional practice. These features could include invoicing, purchasing records, and a time management feature to keep track of billable hours for each project.

A useful product that does not generate revenue advantages for businesses may not be sustainable in the long term. Therefore, a business model can be framed around my app design in the future. Spaces project management app can run on the freemium model, make money from subscriptions and advertisements. Basic services can be free for users, while additional features can be offered via paid subscription. Considering the current version of the app, in the free version, users can use all the functionalities of the app but can be limited to a certain number of images per moodboard and collaborators per project. In the premium membership, users can add unlimited images on moodboards and can collaborate with more people.

Design is endless and I can keep designing features to try to create an ideal experience for the users. However, throughout the project, I kept the experience simple by limiting the features to create a Minimal Viable Product (MVP) for the initial prototype. The reason I set this limitation is that I wanted an application design that can in the near future be further developed and tested



with users so as to understand the changes and requirements necessary in future prototypes. I can create an ideal experience by adding various features, but it may take time to develop and the users may not find it useful. Therefore, I followed the same ideology most of startups follow: create fast, fail fast, and learn fast. For future versions, there can be various features like a measuring tool in the app itself to support shopping and incorporating augmented reality to make the experience easier. More features can be designed after conducting user testing with the first prototype of the app.

Lastly, this application doesn't need to be limited to only the interior design or furniture industry. The concept can be applied to any other retail industry and customers could use this product with additional features for any other shopping journey and not only for furniture shopping.

## Chapter 6 Bibliography

- 15 Best Furniture Shopping Apps for Android & iOS 2019*. (n.d.). Retrieved from <https://freeappsforme.com/furniture-shopping-apps/>
- Aaron Smith, M. A. (2016). *Online Shopping and E-Commerce*. Pew Research Center.
- Abhik Roy, S. T. (2008, September 8). *Store Environment and Shopping Behavior*. Retrieved from [https://www.tandfonline.com/doi/abs/10.1300/J046v15n03\\_05](https://www.tandfonline.com/doi/abs/10.1300/J046v15n03_05)
- Ali, F. (2020, March). *fef*. (Digital Commerce 360 ) Retrieved from <https://www.digitalcommerce360.com/article/e-commerce-sales-retail-sales-ten-year-review/>
- AliceRichmond. (1996). Enticing online shoppers to buy — A human behavior study. *Computer Networks and ISDN Systems*.
- Alison Kenney Paul, S. K. (n.d.). *On the couch Understanding consumer shopping behavior*. (n.d.). *An Introduction to Design Thinking PROCESS GUIDE*. Hasso Plattner Institute of Design at Stanford.
- AnirudhDhebar. (2013). Toward a compelling customer touchpoint architecture. *Business Horizons*.
- Anne R.Smink, S. E. (2019). Try online before you buy: How does shopping with augmented reality affect brand responses and personal data disclosure. *Electronic Commerce Research and Applications*.
- Aouf, R. S. (2019, August 5). *Natuzzi launches Augmented Store for VR furniture shopping*. Retrieved from <https://www.dezeen.com/2019/08/05/natuzzi-augmented-store-virtual-reality-interiors-retail/>
- CANADA, S. (2019, June 5). *The Trends to Watch in Omnichannel Retailing*. Retrieved from <https://www.salesforce.com/ca/blog/2019/06/trends-to-watch-omnichannel-retailing.html>
- CarlosFlavián, R. C. (2019). Feeling Confident and Smart with Webrooming: Understanding the Consumer's Path to Satisfaction. *Journal of Interactive Marketing*, 47, 2-5.
- Carlyle, E. (2018, June 26). *How Much People Spent on Home Renovations in 2017*. (Houzz) Retrieved from <https://www.houzz.com/magazine/data-watch-renovation-spending-up-for-younger-first-time-buyers-stsetivw-vs~84772215>
- Caron, K. (2020). A FURNITURE SHOPPER'S PATH TO PURCHASE. Furniture, Lighting and Decor.

- Chatterjee, P. (2010). Multiple-channel and cross-channel shopping behavior: role of consumer shopping orientations. *Marketing Intelligence & Planning*, 28(1), 2,7.
- Corpuz, J. (2019, December 11). *The best shopping apps for coupons, price comparisons and deals*. Retrieved from <https://www.tomsguide.com/us/pictures-story/910-best-shopping-apps.html>
- Crets, S. (2018, November 19). *Nike's new New York City flagship store incorporates even more app features*. (Digital Commerce 360) Retrieved from <https://www.digitalcommerce360.com/2018/11/19/nikes-new-new-york-city-flagship-store-incorporates-even-more-app-features/>
- Dasey, D. (n.d.). *IKEA PLACE APP*. Retrieved from [https://www.ikea.com/ms/en\\_JP/this-is-ikea/ikea-highlights/2017/ikea-place-app/index.html](https://www.ikea.com/ms/en_JP/this-is-ikea/ikea-highlights/2017/ikea-place-app/index.html)
- Dennis, S. (2018, March 19). *Physical Retail Isn't Dead. Boring Retail Is*. (Forbes) Retrieved from <https://www.forbes.com/sites/stevendennis/2018/03/19/physical-retail-is-not-dead-boring-retail-is-understanding-retails-great-bifurcation/#71f8e7831981>
- Dhruv Grewal, C.-P. A. (2018). In-Store Mobile Phone Use and Customer Shopping Behavior: Evidence from the Field. *Journal of Marketing*, 82, 102-106.
- Emma Sopadjieva, U. M. (2017, January 3). *A Study of 46,000 Shoppers Shows That Omnichannel Retailing Works*. (Harvard Business Review) Retrieved from <https://hbr.org/2017/01/a-study-of-46000-shoppers-shows-that-omnichannel-retailing-works>
- Emspak, J. (2018, June 01). *What is Augmented Reality?* Retrieved from <https://www.livescience.com/34843-augmented-reality.html>
- Felix Heinrichs, D. S. (2011). *The hybrid shopping list: bridging the gap between physical and digital shopping lists*. MobileHCI '11: Proceedings of the 13th International Conference on Human Computer Interaction with Mobile Devices and Services.
- Ferreira, N. M. (2019, May 31). *COLOR PSYCHOLOGY: HOW COLOR MEANINGS AFFECT YOUR BRAND*. (Oberlo) Retrieved from <https://www.oberlo.ca/blog/color-psychology-color-meanings#:~:text=and%20safe%20product,-,Purple%20Color%20Psychology,perceive%20its%20overuse%20as%20arrogant.>
- Fontanella, C. (n.d.). *15 Examples of Brands With Brilliant Omni-Channel Experiences*. Retrieved from Clontfont: <https://blog.hubspot.com/service/omni-channel-experience>

- G.Dacko, S. (2017). Enabling smart retail settings via mobile augmented reality shopping apps. *Technological Forecasting and Social Change*.
- Garun, N. (2019, August 9). *modsy-havenly-ikea-roomstyler-e-interior-design-services-review-virtual-home-redcoration*. Retrieved from <https://www.theverge.com/2019/8/9/20798453/modsy-havenly-ikea-roomstyler-e-interior-design-services-review-virtual-home-redcoration>
- Google, T. w. (2016, July). *How mobile has redefined the consumer decision journey for shoppers*. Retrieved from <https://www.thinkwithgoogle.com/marketing-strategies/app-and-mobile/mobile-shoppers-consumer-decision-journey/>
- Google, T. w. (2016). *The Rise of Comparison Shopping on Mobile: Which-One's-Best Moments*.
- Google, T. w. (2017). *How home furnishing brands can turn browsers into buyers*.
- Google, T. w. (2017). *The key moments to reach home and garden shoppers*.
- Grandigae, S. (2018, October 26). *How Good UX Can Overcome the Need for Customers to be Physically Present*. Retrieved from <https://www.entrepreneur.com/article/322398>
- Group, N. N. (n.d.). *Omnichannel Journeys and Customer Experience*. Retrieved from <https://www.nngroup.com/courses/cross-channel-user-experience/?lm=changing-shopper-behaviors&pt=article>
- Hana Mařová, V. K. (2018). *PURCHASING FACTORS FOR FURNITURE AND CONSUMER GOODS*.
- Harald J.van Heerde, I. M. (2019). Engaging the unengaged customer: The value of a retailer mobile app. *International Journal of Research in Marketing*.
- IKEA. (n.d.). *No-nonsense returns policy*. Retrieved from <https://www.ikea.com/ca/en/customer-service/returns-claims/>
- IMM. (2018, February 2). *Technology Trends in Furniture Industry*. Retrieved from <https://blog.vakoms.com/imm-2018-technology-trends-in-furniture-industry/>
- Jengchung VictorChen, A. T. (2019). Understanding the discontinuance behavior of mobile shoppers as a consequence of technostress: An application of the stress-coping theory. *Computers in Human Behavior*.
- Kovach, N. (n.d.). *14 best Augmented Reality furniture apps*. Retrieved from <https://thinkmobiles.com/blog/best-ar-furniture-apps/>

- Langley, H. (2017, December 7). *New Oculus Rift Core 2.0 lets you build a VR home of your own*. Retrieved from <https://www.wareable.com/vr/oculus-core-2-0-home-dash-update-125>
- Lauren, A. (2019, January 25). *Is Restoration Hardware The Retail Experience That Will Change The Way Millennials Buy Furniture?* Retrieved from <https://www.forbes.com/sites/amandalauren/2019/01/25/is-restoration-hardware-the-retail-experience-that-will-change-the-way-millennials-buy-furniture/#4e5dde703ba9>
- Lee, B. (2019). *Inspirational Shopping: Improving Online Shopping Experience Through Recommendation System Based on Personal Values*.
- Magazine, F. W. (2004, June 22). *The Consumer Purchasing Process - Part 1*. Retrieved from <https://www.furninfo.com/furniture-world-archives/3753>
- Melvin, A. (2019, July). *Rest is best: How IKEA harnessed the appeal of a good night's sleep to drive customers to store*. Retrieved from <https://www.thinkwithgoogle.com/intl/en-ca/marketing-strategies/video/ikea-digital-youtube-campaign/>
- Nielsen, J. (1994, April 24). *10 Usability Heuristics for User Interface Design*. (Nielsen Norman Group) Retrieved from <https://www.nngroup.com/articles/ten-usability-heuristics/>
- Orendorff, A. (2019, February 27). *The Plague of Ecommerce Return Rates and How to Maintain Profitability*. (Shopify) Retrieved from <https://www.shopify.com/enterprise/ecommerce-returns>
- Peter C. Verhoef, P. J. (2015). From Multi-Channel Retailing to Omni-Channel Retailing: Introduction to the Special Issue on Multi-Channel Retailing. *Journal of Retailing*, 19(2), 2.
- PICARD, C. (2020, April 10). *10 Best Grocery Shopping List Apps, According to Nutrition and Tech Experts*. Retrieved from <https://www.goodhousekeeping.com/food-recipes/g26255008/best-grocery-shopping-list-apps/>
- Ponder, N. (2013). *Consumer Attitudes and Buying Behavior for Home Furniture. Prioritization Grid*. (n.d.). (IBM) Retrieved from <https://www.ibm.com/design/thinking/page/toolkit/activity/prioritization>
- Rayome, A. D. (2018, February 15). *How Sephora is leveraging AR and AI to transform retail and help customers buy cosmetics*. Retrieved from

- <https://www.techrepublic.com/article/how-sephora-is-leveraging-ar-and-ai-to-transform-retail-and-help-customers-buy-cosmetics/>
- Rikke Friis Dam, T. Y. (n.d.). *Affinity Diagrams – Learn How to Cluster and Bundle Ideas and Facts*. Retrieved from <https://www.interaction-design.org/literature/article/affinity-diagrams-learn-how-to-cluster-and-bundle-ideas-and-facts>
- Salazar, K. (2016, July 24). *Customer Journeys and Omnichannel User Experience*. Retrieved from <https://www.nngroup.com/articles/customer-journeys-omnichannel/>
- Salazar, K. (2016, December 4). *How Channels, Devices, and Touchpoints Impact the Customer Journey*. Retrieved from <https://www.nngroup.com/articles/channels-devices-touchpoints/?lm=cross-channel-user-experience&pt=course>
- Salazar, K. (2017, March 19). *Seamlessness in the Omnichannel User Experience*. Retrieved from <https://www.nngroup.com/articles/seamless-cross-channel/?lm=customer-journeys-omnichannel&pt=article>
- Salazar, K. (2018, October 28). *In-Store & Online: Designing for the Changing Behaviors of Today's Shoppers*. Retrieved from <https://www.nngroup.com/articles/changing-shopper-behaviors/?lm=store-finders-and-locators&pt=article>
- Schwartz, B. (2006). More Isn't Always Better. *Harvard Business Review*(jUNE 2006).
- Sharma, A. (2017, July 21). *How Retail Can Thrive in a World Without Stores*. Retrieved from <https://hbr.org/2017/07/how-retail-can-thrive-in-a-world-without-stores>
- Shopping Micro-Moments Guide: How to Be There and Be Useful for Shoppers. (2016). Google.
- Shu-Hsien Liao, Y.-C. C. (2011). The effects of psychological factors on online consumer behavior.
- Slatalla, M. (2019, January 15). *Why We React Badly When That New Sofa Arrives*. Retrieved from <https://www.wsj.com/articles/why-we-react-badly-when-that-new-sofa-arrives-11547557200>
- Staff, M. (2018, September 13). *Consumers Are Changing E-Commerce Preferences*. (Dotcom Distribution) Retrieved from <https://www.mhlnews.com/technology-automation/article/22055220/consumers-are-changing-ecommerce-preferences>
- STAFF, W. (2010, January 20). *THE SIMPLICITY OF HELVETICA*. (Web designer Depot) Retrieved from <https://www.webdesignerdepot.com/2010/01/the-simplicity-of->



## Chapter 7 References

- [1] F. Ali, "fef," Digital Commerce 360 , March 2020. [Online]. Available: <https://www.digitalcommerce360.com/article/e-commerce-sales-retail-sales-ten-year-review/>.
- [2] K. Caron, "A furniture shopper's path to purchase," Furniture, Lighting and Decor, 2020.
- [3] J. Toole, "New report finds retail returns totaled \$309 billion in 2019 impacting stores and ecommerce," 13 January 2020. [Online]. Available: <https://www.globenewswire.com/news-release/2020/01/13/1969700/0/en/New-report-finds-retail-returns-totaled-309-billion-in-2019-impacting-stores-and-ecommerce.html>.
- [4] "An Introduction to Design Thinking Process guide," Hasso Plattner Institute of Design at Stanford.
- [5] A. Orendorff, "The Plague of Ecommerce Return Rates and How to Maintain Profitability," Shopify, 27 February 2019. [Online]. Available: <https://www.shopify.com/enterprise/ecommerce-returns>.
- [6] M. Staff, "Consumers Are Changing E-Commerce Preferences," Dotcom Distribution, 13 September 2018. [Online]. Available: <https://www.mhlnews.com/technology-automation/article/22055220/consumers-are-changing-ecommerce-preferences>.
- [7] IKEA, "No-nonsense returns policy," [Online]. Available: <https://www.ikea.com/ca/en/customer-service/returns-claims/>.
- [8] "The State of Returns: What Today's Shoppers Expect," Narvar, 2018.
- [9] E. Carlyle, "How Much People Spent on Home Renovations in 2017," Houzz, 26 June 2018. [Online]. Available: <https://www.houzz.com/magazine/data-watch-renovation-spending-up-for-younger-first-time-buyers-stsetivw-vs~84772215>.
- [10] "Shopping Micro-Moments Guide: How to Be There and Be Useful for Shoppers," Google, 2016.
- [11] M. A. Aaron Smith, "Online Shopping and E-Commerce," Pew Research Center, 2016.
- [12] TIMETRADE, "The State of Retail 2017," TIMETRADE, 2017.
- [13] C.-P. A. L. B. S. M. N. & J. N. a. Dhruv Grewal, "In-Store Mobile Phone Use and Customer Shopping Behavior: Evidence from the Field," *Journal of Marketing*, vol. 82, pp. 102-106, 2018.
- [14] B. Schwartz, "More Isn't Always Better," *Harvard Business Review*, no. jUNE 2006, 2006.



- [15] P. Chatterjee, "Multiple-channel and cross-channel shopping behavior: role of consumer shopping orientations," *Marketing Intelligence & Planning*, vol. 28, no. 1, pp. 2,7, 2010.
- [16] R. C. CarlosFlavián, "Feeling Confident and Smart with Webrooming: Understanding the Consumer's Path to Satisfaction," *Journal of Interactive Marketing*, vol. 47, pp. 2-5, 2019.
- [17] N. Ponder, "Consumer Attitudes and Buying Behavior for Home Furniture," 2013.
- [18] F. W. Magazine, "The Consumer Purchasing Process - Part 1," 22 June 2004. [Online]. Available: <https://www.furninfo.com/furniture-world-archives/3753>.
- [19] P. J. J. Peter C.Verhoef, "From Multi-Channel Retailing to Omni-Channel Retailing: Introduction to the Special Issue on Multi-Channel Retailing," *Journal of Retailing*, vol. 19, no. 2, p. 2, 2015.
- [20] S. Dennis, "Physical Retail Isn't Dead. Boring Retail Is," *Forbes*, 19 March 2018. [Online]. Available: <https://www.forbes.com/sites/stevendennis/2018/03/19/physical-retail-is-not-dead-boring-retail-is-understanding-retails-great-bifurcation/#71f8e7831981>.
- [21] S. Crets, "Nike's new New York City flagship store incorporates even more app features," *Digital Commerce 360*, 19 November 2018. [Online]. Available: <https://www.digitalcommerce360.com/2018/11/19/nikes-new-new-york-city-flagship-store-incorporates-even-more-app-features/>.
- [22] A. Lauren, "Is Restoration Hardware The Retail Experience That Will Change The Way Millennials Buy Furniture?," 25 January 2019. [Online]. Available: <https://www.forbes.com/sites/amandalauren/2019/01/25/is-restoration-hardware-the-retail-experience-that-will-change-the-way-millennials-buy-furniture/#4e5dde703ba9>.
- [23] J. Emspak, "What is Augmented Reality?," 01 June 2018. [Online]. Available: <https://www.livescience.com/34843-augmented-reality.html>.
- [24] A. D. Rayome, "How Sephora is leveraging AR and AI to transform retail and help customers buy cosmetics," 15 February 2018. [Online]. Available: <https://www.techrepublic.com/article/how-sephora-is-leveraging-ar-and-ai-to-transform-retail-and-help-customers-buy-cosmetics/>.
- [25] D. Dasey, "IKEA PLACE APP," [Online]. Available: [https://www.ikea.com/ms/en\\_JP/this-is-ikea/ikea-highlights/2017/ikea-place-app/index.html](https://www.ikea.com/ms/en_JP/this-is-ikea/ikea-highlights/2017/ikea-place-app/index.html).
- [26] R. S. Aouf, "Natuzzi launches Augmented Store for VR furniture shopping," 5 August 2019. [Online]. Available: <https://www.dezeen.com/2019/08/05/natuzzi-augmented-store-virtual-reality-interiors-retail/>.

- [27] IMM, "Technology Trends in Furniture Industry," 2 February 2018. [Online]. Available: <https://blog.vakoms.com/imm-2018-technology-trends-in-furniture-industry/>.
- [28] N. Garun, "modsy-havenly-ikea-roomstyler-e-interior-design-services-review-virtual-home-redecoration," 9 August 2019. [Online]. Available: <https://www.theverge.com/2019/8/9/20798453/modsy-havenly-ikea-roomstyler-e-interior-design-services-review-virtual-home-redecoration>.
- [29] T. Y. S. Rikke Friis Dam, "Affinity Diagrams – Learn How to Cluster and Bundle Ideas and Facts," [Online]. Available: <https://www.interaction-design.org/literature/article/affinity-diagrams-learn-how-to-cluster-and-bundle-ideas-and-facts>.
- [30] "Prioritization Grid," IBM, [Online]. Available: <https://www.ibm.com/design/thinking/page/toolkit/activity/prioritization>.
- [31] N. M. Ferreira, "COLOR PSYCHOLOGY: HOW COLOR MEANINGS AFFECT YOUR BRAND," Oberlo, 31 May 2019. [Online]. Available: <https://www.oberlo.ca/blog/color-psychology-color-meanings#:~:text=and%20safe%20product,-,Purple%20Color%20Psychology,perceive%20its%20overuse%20as%20arrogant..>
- [32] W. STAFF, "THE SIMPLICITY OF HELVETICA," Web designer Depot, 20 January 2010. [Online]. Available: <https://www.webdesignerdepot.com/2010/01/the-simplicity-of-helvetica/#:~:text=Technically%2C%20Helvetica%20is%20a%20very,on%20their%20strokes%2C%20never%20diagonal..>
- [33] J. Nielsen, "10 Usability Heuristics for User Interface Design," Nielsen Norman Group, 24 April 1994. [Online]. Available: <https://www.nngroup.com/articles/ten-usability-heuristics/>.

# Chapter 8 Appendices

## 8.1 Ethics Application

12/12/2019 <https://rem.o.ualberta.ca/REMO/sd/Doc/0/UTL01NBQ0DSKTDIU0JBC26VK42/fromString.html>

**Notification of Approval**

Date: December 10, 2019  
Study ID: Pro00095798  
Principal Investigator: Chandni Luhadiya  
Study Supervisor: Robert Lederer  
Study Title: Furniture shopping user experience design  
Approval Expiry Date: Tuesday, December 8, 2020

Approval Date	Approved Document
12/10/2019	Information letter and statement of consent - store staff (as participant)
12/10/2019	Information letter and statement of consent - store staff (Seeking permission)
12/10/2019	Information letter and statement of consent-Participant observation
12/10/2019	Information letter and statement of consent
12/10/2019	Information letter - Survey (Digital)
12/10/2019	Information letter - Survey (Handout)

Approved Consent Form:

Thank you for submitting the above study to the Research Ethics Board 2. Your application has received a delegated review and been approved on behalf of the committee.

Any proposed changes to the study must be submitted to the REB for approval prior to implementation. A renewal report must be submitted next year prior to the expiry of this approval if your study still requires ethics approval. If you do not renew on or before the renewal expiry date, you will have to re-submit an ethics application.

Approval by the Research Ethics Board does not encompass authorization to access the staff, students, facilities or resources of local institutions for the purposes of the research.

Sincerely,  
Ubaka Ogbogu, LLB, BL, LLM, SJD  
Chair, Research Ethics Board 2

*Note: This correspondence includes an electronic signature (validation and approval via an online system).*

<https://rem.o.ualberta.ca/REMO/sd/Doc/0/UTL01NBQ0DSKTDIU0JBC26VK42/fromString.html> 1/1

Date: October 13, 2020 11:07:02 PM

Print

Close

## 1.1 Study Identification

All questions marked by a *red asterisk* \* are required fields. However, because the mandatory fields have been kept to a minimum, answering only the required fields may not be sufficient for the REB to review your application.

Please answer all relevant questions that will reasonably help to describe your study or proposed research.

- 1.0 \* Short Study Title** (restricted to 250 characters):  
Furniture shopping user experience design
- 2.0 \* Complete Study Title** (can be exactly the same as short title):  
Furniture shopping user experience design
- 3.0 \* Select the appropriate Research Ethics Board** (Detailed descriptions are available at [here](#)):  
Research Ethics Board 2
- 4.0 \* Is the proposed research:**  
Unfunded
- 5.0 \* Name of local Principal Investigator:**  
Chandni Luhadiya
- 6.0 \* Type of research/study:**  
Graduate Student
- 7.0 Investigator's Supervisor**(required for applications from undergraduate students, graduate students, post-doctoral fellows and medical residents to REBs 1 & 2. HREB does not accept applications from student PIs):  
Robert Lederer
- 8.0 Study Coordinators or Research Assistants:** People listed here can edit this application and will receive all email notifications for the study:
- | Name                          | Employer |
|-------------------------------|----------|
| There are no items to display |          |
- 9.0 Co-Investigators:** People listed here can edit this application and will receive email notifications (Co-investigators who do not wish to receive email, should be added to the study team below instead of here).  
If your searched name does not come up when you type it in the box, the user does not have the Principal Investigator role in the online system. Click the following link for instructions on how to [Request an Additional Role](#).
- | Name                          | Employer |
|-------------------------------|----------|
| There are no items to display |          |
- 10.0 Study Team:** (co-investigators, supervising team, and other study team members) - People listed here cannot view or edit this application and do not receive email notifications.

Last Name	First Name	Organization	Role/Area of Responsibility	Phone	Email
-----------	------------	--------------	-----------------------------	-------	-------

There are no items to display

### 1.5 Conflict of Interest

- 1.0 \* Are any of the investigators or their immediate family receiving any personal remuneration (including investigator payments and recruitment incentives but excluding trainee remuneration or graduate student stipends) from the funding of this study that is not accounted for in the study budget?  
 Yes  No
- 2.0 \* Do any of investigators or their immediate family have any proprietary interests in the product under study or the outcome of the research including patents, trademarks, copyrights, and licensing agreements?  
 Yes  No
- 3.0 \* Is there any compensation for this study that is affected by the study outcome?  
 Yes  No
- 4.0 \* Do any of the investigators or their immediate family have equity interest in the sponsoring company? (This does not include Mutual Funds)  
 Yes  No
- 5.0 \* Do any of the investigators or their immediate family receive payments of other sorts, from this sponsor (i.e. grants, compensation in the form of equipment or supplies, retainers for ongoing consultation and honoraria)?  
 Yes  No
- 6.0 \* Are any of the investigators or their immediate family, members of the sponsor's Board of Directors, Scientific Advisory Panel or comparable body?  
 Yes  No
- 7.0 \* Do you have any other relationship, financial or non-financial, that, if not disclosed, could be construed as a conflict of interest?  
 Yes  No

Please explain if the answer to any of the above questions is Yes:

#### **Important**

*If you answered YES to any of the questions above, you may be asked for*

more information.

## 1.6 Research Locations and Other Approvals

- 1.0** \* List the locations of the proposed research, including recruitment activities. Provide name of institution, facility or organization, town, or province as applicable

City of Edmonton, University of Alberta

- 2.0** \* Indicate if the study will use or access facilities, programmes, resources, staff, students, specimens, patients or their records, at any of the sites affiliated with the following (select all that apply):

Not applicable

List all health care research sites/locations:

- 3.0** Multi-Institution Review

- \* 3.1 Has this study already received approval from another REB?

Yes  No

- 4.0** If this application is closely linked to research previously approved by one of the University of Alberta REBs or has already received ethics approval from an external ethics review board(s), provide the study number, REB name or other identifying information. Attach any external REB application and approval letter in the Documentation Section – Other Documents.

## 2.1 Study Objectives and Design

- 1.0** \* Provide a lay summary of your proposed research which would be understandable to general public

This research aims to enhance the furniture shopping experience for consumers. The study will seek to understand the customer shopping behaviour across multiple channels (Online and Offline) in order to design a unified experience at every touch point. The purpose of this research is to identify needs, goals of consumers and issues consumers face in their furniture shopping journey. User Experience (UX) design will be developed that will assist consumers in their decision making in the purchasing of home furniture.

- 2.0** \* Provide a full description of your research proposal outlining the following:

- Purpose
- Hypothesis
- Justification
- Objectives
- Research Method/Procedures
- Plan for Data Analysis

E-commerce has demonstrated an increased growth in the retail market, amounting to a 14.3% share of the total retail sales in 2018, up from 12.9% in 2017. The growth of online shopping has represented a significant change in consumer shopping behaviour. An increased number of people now prefer to shop online rather than in physical stores for numerous reasons, such as the possibility to shop 24/7, the ability to compare prices, to save time, the convenience of not physically visiting a shop, increased variety, many selections, to avoid crowd are but a few of the reasons for this activity. However, in the case of home furniture and interior design, consumers still prefer to visit brick and mortar stores to see, touch, feel and try out items before making a final purchase either at the store or online. When it comes to designing their homes, people often move between digital and physical browsing. This emphasizes the need for designing a seamless experience (Omnichannel) between online and offline channels. The purpose of this research is to identify the needs, goals of consumers and issues they face in their furniture shopping journey. Based on the literature review, I believe that seamless customer journey design can increase customer satisfaction and can reduce buyers remorse.

User Experience (UX) design is the process designers use to enhance user satisfaction with products and services. In today's world, there are several touchpoints between companies and customers. These points of interactions can be either in-store or online (via email, social media, web, mobile apps etc.). Consumers nowadays expect an experience that is efficient, accessible and that will be consistent as they switch channels and context. UX failures on any one of these channels create a bad overall customer experience. The objective of my paper is to assist consumers to make more confident decisions about furniture shopping.

My aim for this research is to identify problem areas in the consumer shopping journey by conducting interviews, focus groups and ethnographic research. Interviews will allow me to understand the perspective of individual consumers. Focus groups will allow me to observe and listen to the discussion between primary consumers and secondary users like friends and family. Moreover, ethnographic research will allow me to observe people to understand how they behave in a retail furniture store and to understand their thought process in buying furniture. The sum of these three research methods will give me rich insights to develop effective design solution.

After the research, I will propose my final design solution which will assist consumers in furniture shopping.

- 3.0 Describe procedures, treatment, or activities that are above or in addition to standard practices in this study area (eg. extra medical or health-related procedures, curriculum enhancements, extra follow-up, etc):**
- 4.0 If the proposed research is above minimal risk and is not funded via a competitive peer review grant or industry-sponsored clinical trial, the REB will require evidence of scientific review. Provide information about the review process and its results if appropriate.**
- 5.0 For clinical trials, describe any sub-studies associated with this Protocol.**

## 2.2 Research Methods and Procedures

*Some research methods prompt specific ethical issues. The methods listed below have additional questions associated with them in this application. If your research does not involve any of the methods listed below, ensure that your proposed research is adequately*

described in Section 2.1: Study Objectives and Design or attach documents in the Documentation Section if necessary.

**1.0 \* This study will involve the following (select all that apply)**

- Interviews and/or Focus Groups
- Participant Observation
- Surveys and Questionnaires (including internet surveys)

*NOTE 1: Select this ONLY if your application SOLELY involves a review of paper charts/electronic health records/administrative health data to answer the research question. If you are enrolling people into a study and need to collect data from their health records in addition to other interventions, then you SHOULD NOT select this box.*

*NOTE 2: Select this option if this research ONLY involves analysis of blood/tissue/specimens originally collected for another purpose but now being used to answer your research question. If you are enrolling people into the study to prospectively collect specimens to analyze you SHOULD NOT select this box.*

## 2.5 Interview and/or Focus Groups

**1.0 Will you conduct interviews, focus groups, or both? Provide detail.**

I will conduct both interviews and focus groups. Face to face interviews will help me understand the requirements of furniture shoppers and the issues they face. Focus groups will help me discuss together with the primary shoppers, decision influencers (like friends and family) and salespeople to understand the requirements of furniture shoppers.

**2.0 How will participation take place (e.g. in-person, via phone, email, Skype)?**

Participation will take place in person. I will conduct some interviews at furniture stores and some in my office at Industrial design department, University of Alberta. Both interviews and focus groups will be scheduled at a location that is convenient for participant. Interview will last no longer than 30 mins for each participant. Focus group session will last about an hour.

**3.0 How will the data be collected (e.g. audio recording, video recording, field notes)?**

The data will be collected through field notes and sketches.

## 2.7 Participant Observation

**1.0 Who will the observer be?**

Principal Investigator: Chandni Luhadiya

**2.0 Who is being observed?**

Customers visiting the furniture store will be observed.



**3.0 Why are they being observed?**

Sometimes what people say is different from what they do. People do not often know their exact needs. They get accustomed to certain advertised designs and so do not speak about it. As a designer and researcher, it is essential for me to get insights about the struggle people face in shopping furniture which they themselves do not know. This will be possible through ethnographic study which will give me rich research insights to create effective solutions. Ethnography study will allow me to observe how user behave, and if they touch, sit or just look at furniture.

**4.0 When and where will participants be observed (i.e. during class, during their workday)?**

Participants will be observed between 12-5 pm at Furniture stores in the Edmonton region. I will take consent from the salespeople/manager of the furniture store to observe participants and after that, I will recruit participants for observation by providing them with the hardcopy of the information letter and consent form which they can sign to provide consent.

**5.0 Will others be present who are not being observed (i.e. non-participants)?**

Yes  No

**6.0 What data will be collected?**

Field notes

## 2.9 Surveys and Questionnaires (including Online)

**1.0 How will the survey/questionnaire data be collected (i.e. collected in person, or if collected online, what survey program/software will be used etc.)?**

Survey Data will be collected online

**2.0 Where will the data be stored once it's collected (i.e. will it be stored on the survey software provider servers, will it be downloaded to the PI's computer, other)?**

Data will be stored in Google survey portal and will also be downloaded and stored in my Google drive.

**3.0 Who will have access to the data?**

The data will be encrypted by google (written in terms and conditions of google survey tool). I will be the only person who will be able to access the data. I will keep the data in my google drive password protected and will never share personal details of any participant. I will delete all the personal details once my research is over.

## 3.1 Risk Assessment

**1.0 \* Provide your assessment of the risks that may be associated with this research:**

Minimal Risk - research in which the probability and magnitude of possible harms implied by participation is no greater than those encountered by participants in those aspects of their everyday life that relate to the research (TCPS2)

**2.0 \* Select all that might apply:**

Description of Possible Physical Risks and Discomforts	
No	Participants might feel physical fatigue, e.g. sleep deprivation
No	Participants might feel physical stress, e.g. cardiovascular stress tests
No	Participants might sustain injury, infection, and intervention side-effects or complications
No	The physical risks will be greater than those encountered by the participants in everyday life

Possible Psychological, Emotional, Social and Other Risks and Discomforts	
Possibly	Participants might feel psychologically or emotionally stressed, demeaned, embarrassed, worried, anxious, scared or distressed, e.g. description of painful or traumatic events
No	Participants might feel psychological or mental fatigue, e.g. intense concentration required
No	Participants might experience cultural or social risk, e.g. loss of privacy or status or damage to reputation
No	Participants might be exposed to economic or legal risk, for instance non-anonymized workplace surveys
No	The risks will be greater than those encountered by the participants in everyday life

**3.0 \* Provide details of all the risks and discomforts associated with the research for which you indicated YES or POSSIBLY above.**

Individuals may recall emotionally stressful memories regarding furniture shopping experience during participation in interviews, focus groups and surveys. While the questions being asked are more practical in nature, there is a chance that individuals will feel discomfort while discussing past experience about their furniture shopping.

**4.0 \* Describe how you will manage and minimize risks and discomforts, as well as mitigate harm:**

Individuals can withdraw participation from the study at any time if they are uncomfortable, friends and family will be contacted on their behalf, if required.

**5.0 Is there a possibility that your research procedures will lead to unexpected findings, adverse reactions, or similar results that may require follow-up (i.e. individuals disclose that they are upset or distressed during an interview/questionnaire, unanticipated findings on MRI, etc.)?**

Yes  No

**6.0 If you are using any tests in this study diagnostically, indicate the member(s) of the study team who will administer the measures/instruments:**

Test Name	Test Administrator	Organization	Administrator's Qualification
-----------	--------------------	--------------	-------------------------------

There are no items to display

- 7.0 **If any research related procedures/tests could be interpreted diagnostically, will these be reported back to the participants and if so, how and by whom?**

### 3.2 Benefits Analysis

- 1.0 **\* Describe any potential benefits of the proposed research to the participants. If there are no benefits, state this explicitly:**  
There are no potential benefits to the participants.
- 2.0 **\* Describe the scientific and/or scholarly benefits of the proposed research:**  
The proposed research will be a significant addition to the existing research on retail shopping experience. Customer buying journey will be thoroughly examined which will reveal the needs, and expectations in this digital era. This information can be used by future researchers and designers in order to create cohesive and seamless User Experience (UX) for retail customers.
- 3.0 **If this research involves risk to participants explain how the benefits outweigh the risks.**  
The research outcome will provide a new perspective towards retail shopping. This research can also be used by researchers from fields other than design such as marketing. This will benefit both customers and retail industry to create solutions which would suit the needs of modern day consumers. The design solution will help consumers to shop for retail items easily and confidently. It may also reduce the chances of buyer's remorse in the retail industry. Risk is minimal, and the benefit of participation in the research overshadows the risk.

### 4.1 Participant Information

- 1.0 **\* Will you be recruiting human participants (i.e. enrolling people into the study, sending people online surveys to complete)?**  
 Yes  No
- 1.1 Will participants be recruited or their data be collected from Alberta Health Services or Covenant Health or data custodian as defined in the Alberta Health Information Act?**  
 Yes  No

### 4.2 Additional Participant Information

- 1.0 **Describe the participants that will be included in this study. Outline ALL participants (i.e. if you are enrolling healthy controls as well):**

I will be consulting with retail shoppers who have either shopped for furniture before or are planning to shop.

I will also be consulting with sales people of furniture stores to understand their perspective towards their clients' furniture shopping behaviour.

**2.0 \* Describe and justify the inclusion criteria for participants (e.g. age range, health status, gender, etc.):**

Participants will be from age 25-45, of any race, any gender with good english speaking, writing and comprehension skill. I would like to study this age group because I want to gain perspective from individuals who are moving to their next phase of life either living independently, or getting married and looking for furniture to adjust to new life. Also, I want to develop digital design such as mobile application and website designs. After I conducted the literature review, it became evident that persons in this age are more inclined towards technology and would benefit the most from my design.

I would like to address the needs of all genders and races, therefore, all races and genders will be included in my research.

**3.0 Describe and justify the exclusion criteria for participants:**

I want to design for people who use multiple channels such as online and physical stores to shop for furniture.

Majority of people below 25 years of age are technically savvy but are not the primary buyers of furniture. Also, people above age 45, intend to buy furniture but usually are not comfortable with digital technology.

Therefore, for my design proposals, I want to conduct research with people of age between 25-45.

I will not be including persons with visual impairment as my project involves relating digital and physical imagery of furniture for research information.

**4.0 Participants**

**4.1 How many participants do you hope to recruit (including controls, if applicable?)**  
100

**4.2 Of these, how many are controls, if applicable?**

**4.3 If this is a multi-site study, how many participants do you anticipate will be enrolled in the entire study?**

**5.0 Justification for sample size:**

8 participants for focus groups and interviews. 10 participants for ethnographic study (2 retail stores). 100 participants for surveys.

Smaller focus groups, interviews and ethnographic study will provide me the qualitative data.

Online survey of 100 participant will provide me the quantitative data for my research.

#### 4.4 Recruitment of Participants (non-Health)

##### 1.0 Recruitment

###### 1.1 How will you identify potential participants? Outline all of the means you will use to identify who may be eligible to be in the study

(i.e. response to advertising such as flyers, posters, ads in newspapers, websites, email, list serves, community organization referrals, etc.)

The researcher will take approval from store staff to observe people for their furniture buying activities in their furniture store. The researcher will also take approval from store staff to approach customers in the store to provide information about interviews, focus groups, participant observation, and survey research methods and to recruit interested participants. Information letter and consent form handouts for interviews focus groups and participant observation will be distributed to the customers. An information letter for the survey will be distributed to the customer. Interested participants can then provide their email addresses to the researcher. The researcher will contact the participants for interviews, focus groups and observation. Also, the researcher will email the information about the survey with the link of the survey to the participants. The submission of the survey would infer their consent. Moreover, the researcher will approach colleagues and other persons who fit the inclusion criteria, who work at the University of Alberta and will share details about the research with them by providing information letter and consent forms. Email addresses will be collected in a separate list of all the people interested in participating.

The researcher will also approach store staff to participate in the research by providing them with the information letter and statement of consent handout. Interested store staff will be invited for interviews and focus groups.

###### 1.2 Once you have identified a list of potentially eligible participants, indicate how the potential participants' names will be passed on to the researchers AND how will the potential participants be approached about the research.

Participants will be sent details about my research study as well as my contact details such as full name, phone number, email address. They will be provided with information letter and a consent form for interviews, focus groups and observation. Once they sign and return the consent form, the research process will start as per their availability. For participants interested in survey, information of the survey will be provided to them with the link footed survey. Submission of the survey will infer their consent.

##### 2.0 Pre-Existing Relationships

**2.1 Will potential participants be recruited through pre-existing relationships with researchers** (e.g. Will an instructor recruit students from his classes, or a physician recruit patients from her practice? Other examples may be employees, acquaintances, own children or family members, etc.)?

Yes  No

**2.2 If YES, identify the relationship between the researchers and participants that could compromise the freedom to decline** (e.g. clinician/patient, professor/student)  
Colleagues, friends and family.

**2.3 How will you ensure that there is no undue pressure on the potential participants to agree to the study?**

They will have the same opportunity to decline as any other participant as outlined in 1.0 in section 4.4.

- 3.0 Will your study involve any of the following? (select all that apply)**  
None of the above

#### 4.5 Informed Consent Determination

- 1.0 Describe who will provide informed consent for this study (i.e. the participant, parent of child participant, substitute decision maker, no one will give consent – requesting a waiver)**  
All participants will have the capacity to give free and informed consent.

**1.1 Waiver of Consent Requested**

**If you are asking for a waiver of participant consent, please justify the waiver or alteration and explain how the study meets all of the criteria for the waiver. Refer to Article 3.7 of TCPS2 and provide justification for requesting a Waiver of Consent for ALL criteria (a-e)**

**1.2 Waiver of Consent in Individual Medical Emergency**

**If you are asking for a waiver or alteration of participant consent in individual medical emergencies, please justify the waiver or alteration and explain how the study meets ALL of the criteria outlined in Article 3.8 of TCPS2 (a-f).**

- 2.0 How will consent be obtained/documented? Select all that apply**  
Signed consent form  
Implied by overt action (i.e. completion of questionnaire)

**If you are not using a signed consent form, explain how the study information will be provided to the participant and how consent will be obtained/documented. Provide details for EACH of the options selected above:**

All participants in the interviews, focus groups and individual observational will be provided a consent form to sign. All participants in an online survey, by completing and submitting their answers, their action infers an implied consent.

I will take the signed consent from the salespeople/manager of the furniture store to observe participants and after that, I will recruit participants for observation by providing them with the hardcopy of the information letter and consent form which they can sign to provide consent.

I will also take the signed consent from the store staff to seek permission to speak to customers in their store.

- 3.0 Will every participant have the capacity to give fully informed consent on his/her own behalf?**

Yes  No

- 4.0 What assistance will be provided to participants or those consenting on their behalf, who may require additional assistance? (e.g. non-English speakers, visually impaired, etc.)**

My study will only consider english speakers because it will help me







**are aware of their responsibilities concerning participants' privacy and the confidentiality of their information?**

I am the principal investigator, and I will be the only study personnel. I am aware of the responsibilities concerning participants' privacy and I will keep the participants' personal data confidential. Digital data will be kept secured on an encrypted external hard drive and hard copies will be locked in a filing cabinet in my office at UofA.

**3.0 External Data Access**

**\* 3.1 Will identifiable data be transferred or made available to persons or agencies outside the research team?**

Yes  No

## 5.4 Data Storage, Retention, and Disposal

**1.0 \* Describe how research data will be stored, e.g. digital files, hard copies, audio recordings, other. Specify the physical location and how it will be secured to protect confidentiality and privacy. (For example, study documents must be kept in a locked filing cabinet and computer files are encrypted, etc. Write N/A if not applicable to your research)**

Digital files will be kept on an encrypted external hard drive. Hardcopies will be locked in a filing cabinet in my office at the University of Alberta.

**2.0 \* University policy requires that you keep your data for a minimum of 5 years following completion of the study but there is no limit on data retention. Specify any plans for future use of the data. If the data will become part of a data repository or if this study involves the creation of a research database or registry for future research use, please provide details. (Write N/A if not applicable to your research).**

There is no plan for future use of the participant's data collected during this research.

**3.0 If you plan to destroy your data, describe when and how this will be done? Indicate your plans for the destruction of the identifiers at the earliest opportunity consistent with the conduct of the research and/or clinical needs:**


I will retain digital files on an encrypted hard drive and hard copies in a locked filing cabinet at my place of residence following the completion of my studies at the university. After 5 years, following the completion of my studies, I will erase all the digital data from the hard drive, and shred all the hard copies using paper shredder in order to destroy the data.

## Documentation

Add documents in this section according to the headers. Use Item 11.0 "Other Documents" for any material not specifically mentioned below.

Sample templates are available by clicking [HERE](#).

#### 1.0 Recruitment Materials:

Document Name	Version	Date	Description
 Recruitment email or handout	0.02	11/6/2019 3:05 PM	

#### 2.0 Letter of Initial Contact:

Document Name	Version	Date	Description
There are no items to display			

#### 3.0

##### Informed Consent / Information Document(s):

**3.1 What is the reading level of the Informed Consent Form(s):**  
Grade 7


##### 3.2 Informed Consent Form(s)/Information Document(s):

Document Name	Version	Date	Description
 Information letter and statement of consent	0.02	11/6/2019 2:39 PM	
 Information letter - Survey (Handout)	0.03	12/6/2019 2:19 PM	
 Information letter and statement of consent- Participant observation	0.01	11/7/2019 12:14 AM	
 Information letter and statement of consent - store staff (Seeking permission)	0.04	12/7/2019 12:03 AM	
 Information letter - Survey (Digital)	0.01	12/6/2019 2:22 PM	
 Information letter and statement of consent - store staff (as participant)	0.01	12/7/2019 12:57 AM	

#### 4.0 Assent Forms:

Document Name	Version	Date	Description
There are no items to display			

#### 5.0 Questionnaires, Cover Letters, Surveys, Tests, Interview Scripts, etc.:

Document Name	Version	Date	Description
 Questions	0.01	11/1/2019 1:52 PM	

#### 6.0 Protocol/Research Proposal:

Document Name	Version	Date	Description
There are no items to display			

#### 7.0 Investigator Brochures/Product Monographs:

Document Name	Version	Date	Description
---------------	---------	------	-------------

There are no items to display

#### 8.0 Health Canada No Objection Letter (NOL):

Document Name	Version	Date	Description
---------------	---------	------	-------------

There are no items to display

#### 9.0 Confidentiality Agreement:

Document Name	Version	Date	Description
---------------	---------	------	-------------

There are no items to display

#### 10.0 Conflict of Interest:

Document Name	Version	Date	Description
---------------	---------	------	-------------

There are no items to display

#### 11.0 Other Documents:

*For example, Study Budget, Course Outline, or other documents not mentioned above*

Document Name	Version	Date	Description
---------------	---------	------	-------------

There are no items to display

### Final Page

You have completed your ethics application! Click "Continue" to go to your study workspace.

**This action will NOT SUBMIT the application for review.**

**Only the Study Investigator** can submit an application to the REB by selecting the "SUBMIT STUDY" button in My Activities for this Study ID:Pro00095798.

## Questions

### Personal Interview:

1. When was the last time you bought furniture for your house and what was the occasion?
2. What is your typical home furniture shopping journey?
3. Where do you usually take inspiration/references from?
4. What is your process of finalizing the outlet to buy furniture from?
5. How do you keep track of your budget while shopping for your house?
6. What are the challenges you face while shopping for home furniture for your house?
7. Have you ever experienced buyer's remorse after purchasing furniture? If yes, what was the reason?
8. How do you think your furniture shopping experience can be improved?

### Survey:

- 1) What channel do you use in your furniture shopping journey?  
a) Online b) In store C) Mixture of both
- 2) How many stores do you visit before finalizing furniture for your house?  
a) 0-2 b) 3-5 c) more than 5
- 3) Do you struggle with remembering the details of the products you liked at each store?  
a) Yes b) No c) Sometimes
- 4) Do you prefer to see products you like next to each other to better understand the look of the overall space?  
a) Yes b) No c) Sometimes
- 5) Do you take opinions from friends and family before buying furniture?  
a) Yes b) No C) Sometimes
- 6) How much time do you usually take to buy all the furniture and decor?

a) less than a month b) less than a year c) more than 1 year

7) Have you ever faced buyers' remorse after buying furniture?

a) Always c) Sometimes c) Never

8) How is furniture shopping experience is for you?

a) Happy b) hectic and tiring c) Mix

9) How often do you buy furniture for your house?

a) every month b) every year c) Every few years

#### **Focus Groups**

1) What is your process of selecting furniture for your space?

2) How often do you take other's opinions?

3) How and do you share furniture selections?

4) How do you give feedback?

5) What are the challenges you face in the overall furniture buying journey?

7) Is there anything else you would like to share?

#### **Usability testing**

1) How easily have you reached your goal?

2) Do you think this app solves the issues you spoke about in the interview?

3) How would you like to rate this app out of 10?

4) How do you think, this app can be made more suitable for your needs?

## Furniture Shopping Experience

What channel do you use in your furniture shopping journey?

- Online
- In Store
- Mixture of both

How many stores do you visit before finalizing furniture for your house?

- 0-2
- 3-5
- More than 5

Do you struggle with remembering the details of the products you liked at each store?

- Yes
- No
- Sometimes



Figure 8-1 Survey form

Do you prefer to see products you like next to each other to better understand the look of the overall space?

- Yes
- No
- Sometimes

Do you take opinions from friends and family before buying furniture?

- Yes
- No
- Sometimes

How much time do you usually take to buy all the furniture and decor?

- Less than a month
- Less than a year
- More than 1 year

Have you ever faced buyers' remorse after buying furniture?

- Always
- Sometimes
- Never



Figure 8-2 Survey form

How often do you buy furniture for your house?

- Every month
- Every year
- Every few years

How is furniture shopping experience for you?

- Happy
- Hectic and tiring
- Mix

Submit

This form was created inside of University of Alberta. [Report Abuse](#)

Google Forms

*Figure 8-3 Survey form*



## 8.2 Posters and Exhibition

# Abstract

### Introduction

Shopping is one of the most common and frequent activities in everyone's life. There are a plethora of ways to shop using multiple channels either in-store or online. E-commerce has demonstrated an increased growth in the retail market, amounting to a 16% share of the total retail sales in 2019, up from 14.4% in 2018. Also, in 2020, COVID-19 has exponentially increased online shopping. The growth of online shopping has represented a significant change in consumer shopping behavior. An increased number of people now prefer to shop online rather than in brick and mortar stores for numerous reasons. The ability to shop 24/7, to compare prices, to save time, the convenience of not physically visiting a shop, increased variety, more selections, to avoid crowded places are but a few of the reasons for this activity. However, in the case of home furniture and interior design, consumers still prefer to visit multiple brick and mortar stores to see, touch, feel and try out items before making a final purchase either at the store or back online. When it comes to designing their homes, people often move between digital and physical browsing channels. Any bad decision made in any of these channels leads to a bad overall shopping experience.

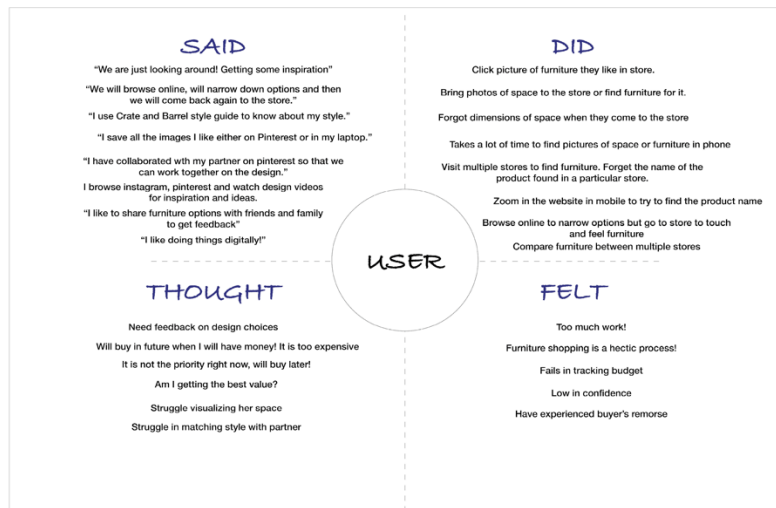
Buyer's remorse is one of the most common emotions associated with furniture shopping, as furniture shopping is an expensive and time-consuming process. A typical furniture shopping journey has multiple stages. The purpose of this research is to identify the needs, goals of consumers, and the issues they face in their furniture shopping journey. Connecting the dots between each stage of their shopping journey, this thesis hopes to design a seamless experience. Throughout this project, I have followed 5 steps of the design thinking process developed by the Hasso-Plattner Institute of Design at Stanford (d. school). The five steps are Research, Define, Ideate, Prototype, and Test.

*Figure 8-4 Poster 1, Abstract*

# Research

## Conducting primary and secondary research

To understand the shopping behavior of furniture shoppers and what companies are currently doing to support their behavior, I conducted both secondary and primary research. In my secondary research, I reviewed multiple papers on shopping behavior and studied market trends. In primary research, I conducted interviews, surveys, and observation.



### Empathy map

Based on the data I received from user interviews, surveys, and observation, I created an empathy map that shows what users said, did, felt, and thought during their furniture shopping journey.

This empathy map helped me to understand the users' shopping behavior, their requirements, and their expectations from the furniture retail industry.

	Visualization with other products	Compare multiple stores	Organizer and Budget tracker	Collaboration and share	Browsing
Pepper Fry	✗	✗	✗	<ul style="list-style-type: none"> <li>✓ Sharing with others</li> <li>✗ No design with collaboration</li> </ul>	<ul style="list-style-type: none"> <li>✓ Has wishlist for future use</li> <li>✗ No feature to save images saw in store.</li> </ul>
Home-Design & decor shopping	✗	✓	✗	<ul style="list-style-type: none"> <li>✓ Sharing with others</li> <li>✗ No design with collaboration</li> </ul>	<ul style="list-style-type: none"> <li>✓ Has wishlist for future use</li> <li>✗ No feature to save images saw in store.</li> </ul>
Wayfair- Shop all things home	✗	✗	<ul style="list-style-type: none"> <li>✓ Organizer</li> <li>✗ No budget tracker</li> </ul>	<ul style="list-style-type: none"> <li>✓ Sharing with others</li> <li>✗ No design with collaboration</li> </ul>	<ul style="list-style-type: none"> <li>✓ Has wishlist for future use</li> <li>✓ Barcode scan to save images saw in store.</li> </ul>
Ikea	✓	✗	✗	<ul style="list-style-type: none"> <li>✓ Sharing with others</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓ Has wishlist for future use</li> <li>✓ Barcode scan to save images saw in store.</li> </ul>
Overstock Furniture and decor	✓	✓	✗	<ul style="list-style-type: none"> <li>✓ Sharing with others</li> <li>✗ No design with collaboration</li> </ul>	<ul style="list-style-type: none"> <li>✓ Has wishlist for future use</li> <li>✗ No feature to save images saw in store.</li> </ul>

### Competitive analysis

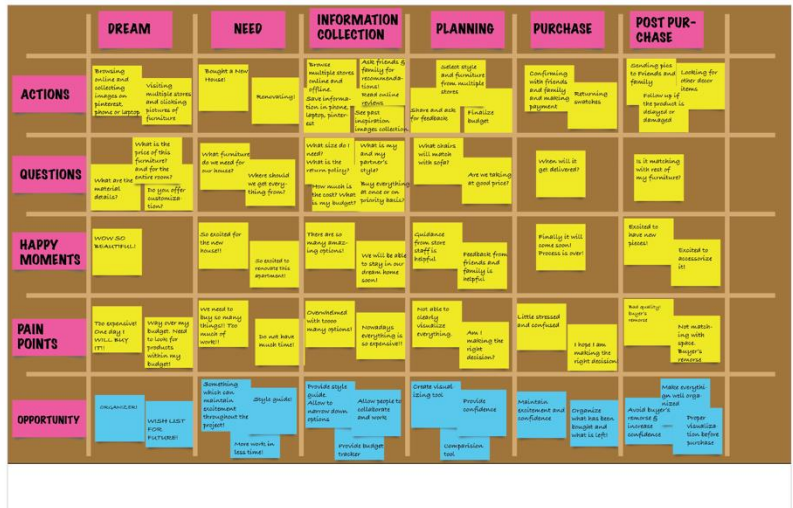
I conducted a competitive analysis to understand what brands are currently doing to enhance the experience of furniture shoppers.

When comparing what shoppers need and what companies are currently doing, it is found out that there is a gap that has not been addressed.

**Shoppers shop from multiple stores. They struggle to visualize & compare furniture from several stores. However, the majority of the companies allow shoppers to select and visualize products available only in their stores.**

I decided to explore this further and define the problem.

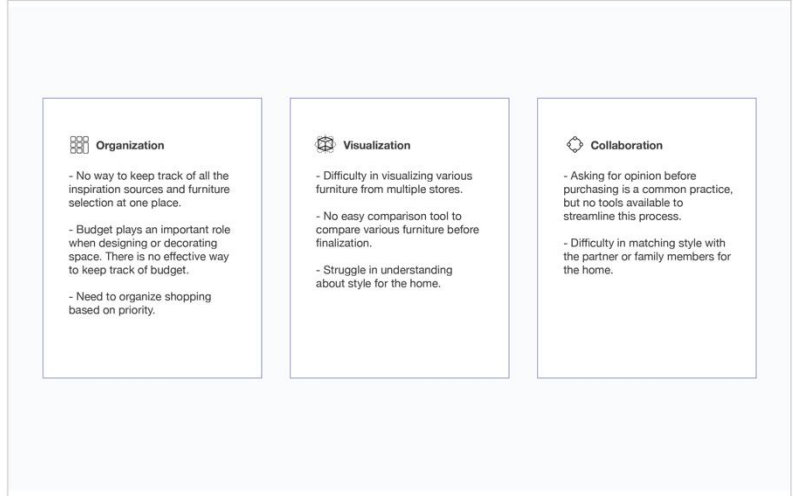
Figure 8-5 Poster 2, Research



**Journey map**

Based on the personas I created, I mapped out the furniture shopping journey of the users. I divided their shopping journey into six stages and wrote down the actions they take, the questions they have, their happy moments, their pain points at each stage of their shopping journey.

This helped me in identifying opportunity areas at every step and to ideate solutions accordingly.



**Insights**

After analyzing the data from the Affinity map and Journey map, I was able to categorize the insights into three major categories: Organization, Visualization, and Collaboration.

This categorization gave me clear goals to focus on while designing solutions for furniture shoppers.

**Define**

**Synthesizing research and defining focus areas**

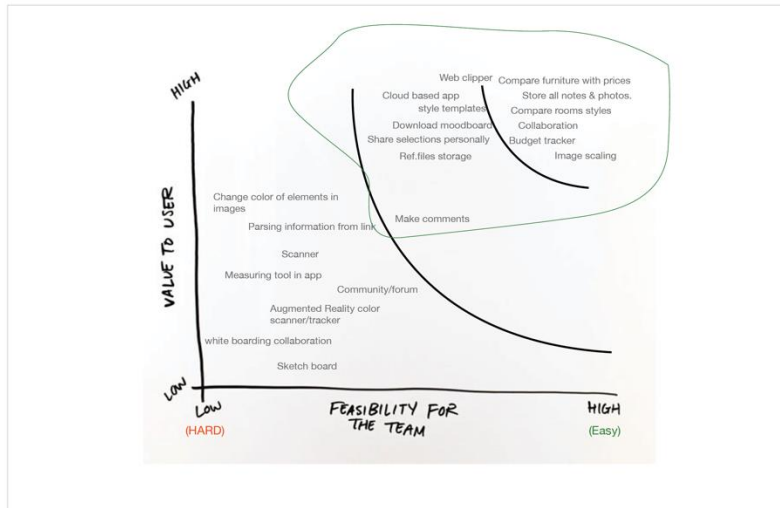
After identifying the gap in the current market by conducting extensive research, I used various research synthesis methods such as Affinity diagram to find out the common patterns in the users' behavior. Based on that, I recognized three main user types and developed user personas. Afterward, I mapped out their shopping journey and defined focus areas.

Figure 8-6 Poster 3, Define

# Ideate

## Designing solutions and selecting features

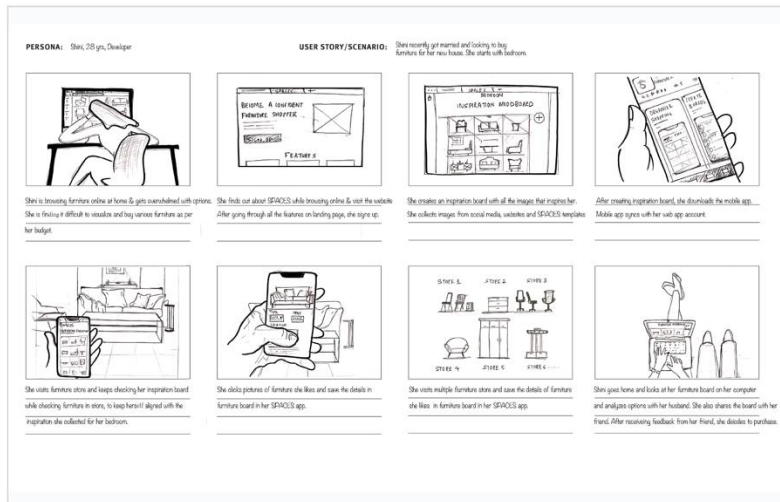
- Based on the goals I defined in the Define phase, I decided to design a web application that would support the user's online browsing process and a mobile application that would assist the user's in-store shopping experience.
- I took inspiration from some of the top project management and interior apps to decide the name of the app. I brainstormed features, defined limitations for the first version, and created wireframes.



### Brainstorming

I brainstormed solutions based on the app goals defined in the Define phase. I came up with 30+ ideas, and I used the IBM Prioritization grid to select the features that can be implemented in my app.

Design is endless and I can keep designing features to try to create an ideal experience for the users. However, throughout the project, I kept the app's experience simple by limiting the number of features to create a minimum viable product. The reason I set this limitation is that I wanted the application design in such a way that it can be developed in a couple of months and can be tested with users to understand the requirements for future versions.

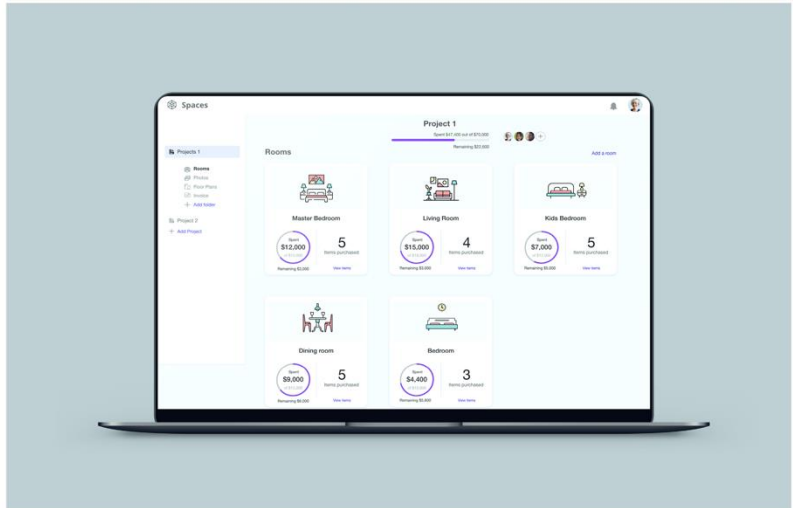


### Storyboard

To better understand how people are going to use my app, I created a storyboard which essentially shows major steps users will go through in their furniture shopping journey and how my app can benefit them.

This storyboard helped me to visualize the scenarios the users will be using the app in, which helped to make design decisions according to the context.

Figure 8-7 Poster 4, Ideate



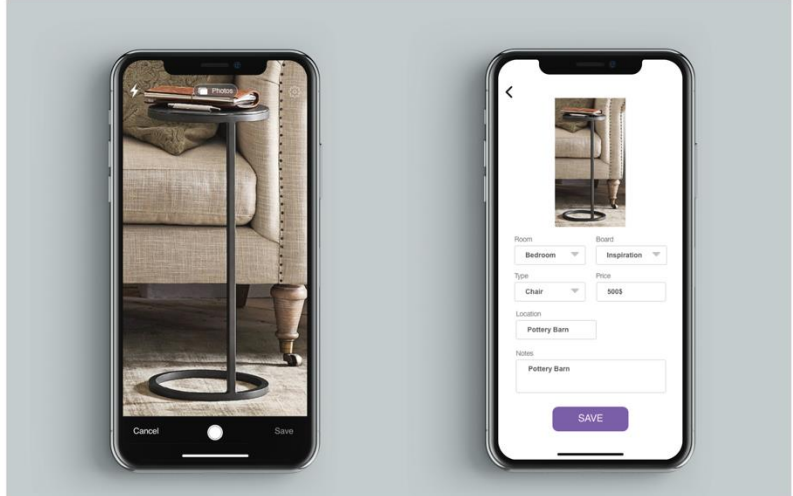
**Web application**

I designed a web application to help people effectively organize, visualize, and collaborate when they are designing their dream home.

I designed features such as Spaces clipper which can help users in organizing their browsing experience during the research phase of their furniture shopping journey and designed a dashboard to help them quickly scan through the important information they require to make selections.

I created user-friendly inspiration and furniture moodboard spaces with features of resizing and category grouping to help them visualize various options effectively considering their budget.

I made various features to help users collaborate with the people on the project and also receive feedback easily from non-collaborators



**Mobile application**

As most of the features in the mobile app are similar to the web app design, I have decided to make the high-fidelity screen of only the camera feature as this is the feature that is not available in web app design and this can be very useful for the shoppers.

The user can click the picture of the furniture or any inspiration using the app's camera. Once the user clicks on save, the user will be moved to the next screen where the user will be asked to fill in the details of the product. The user can fill in the details and the image with the details will be saved directly in the selected moodboard.

**Prototype**  
**Designing web and mobile application**

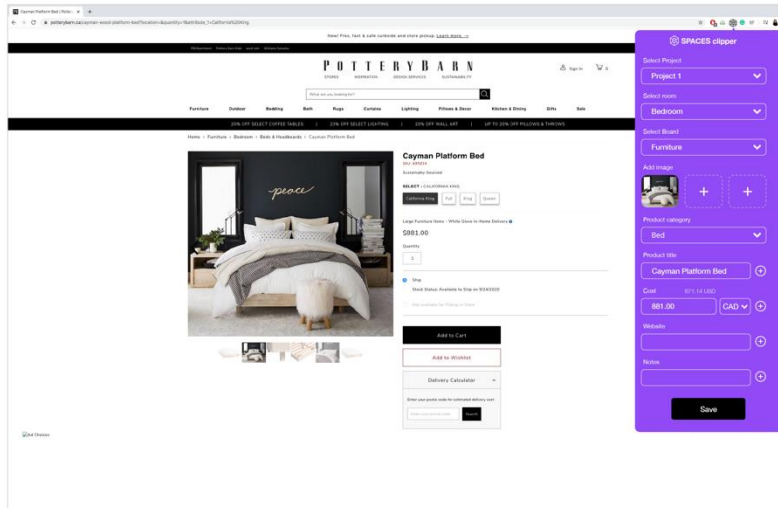
During my research phase, I found out that furniture shoppers browse online and conduct extensive research on furniture before purchasing. They also visit multiple stores to select furniture and to touch, feel, or try out furniture items. Therefore, to support their online and in-store experiences, I designed high-fidelity prototypes of web and mobile application.

Figure 8-8 Poster 5, Prototype

# Test

## User testing and refining features

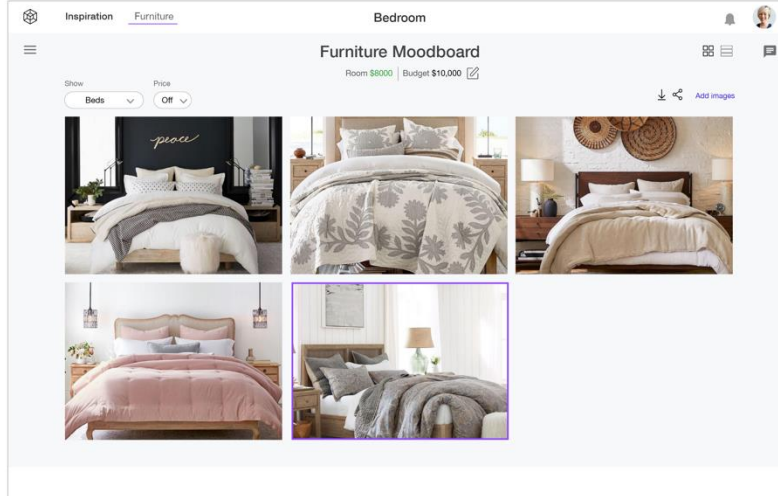
Based on the feedback I received from the users after discussing the high-fidelity prototype with them, I decided to make some changes to two main features of the design: Spaces Clipper and Moodboard filter.



### Spaces clipper

While designing the Spaces Clipper, I made all the text fields to be filled automatically once the users hover and click on the data on the website after clicking on the respective text fields. However, after taking feedback from the users, I realized that the users prefer to customize the title of the product as per their preference as a lot of the websites have names which are hard to recall later on. Therefore, I added a manual data entry option. I added a plus icon next to the text fields. Only when the users click on the plus icon and click on any information on the website, the data will be entered automatically.

Also, I added two currency options in the clipper. The currency in which the users have initially selected the budget (on the dashboard) will be considered the main currency. If the users add the cost of the product in clipper in any other currency, the amount will be converted into the original currency (similar to budget) and will be reflected in grey font above the cost field. This original currency will be displayed everywhere from moodboards to a detailed view of products.



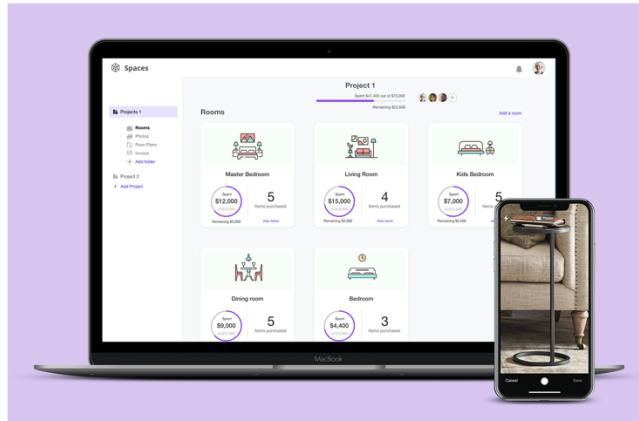
### Moodboard filter

In the original moodboard filter, I gave the option to select furniture categories and only those furniture categories will be displayed and the room price will remain the same as what they had with all the furniture categories displayed. However, later on, I realized that it would be better if I give the option to change the selection from the single category view and the room price will also change accordingly on top. This will help users to select from various options of a single furniture category.

Figure 8-9 Poster 6, Test

# Future thinking

## Summary and future possibilities



### Summary

After multiple iterations, discussions with the users and my supervisor, I designed a mobile and web application to help people effectively organize, visualize, and collaborate when they are designing their dream home.

### Future thinking

This application can be expanded in the future to be used for most of the furnishing and décor items required to design residential and commercial interiors.

With additional features, this application could also be used by interior designers on industry projects for the client-designer discussions on design projects.

Spaces project management app can have a business model and can run on the freemium model, make money from subscriptions and advertisements. Basic services can be free for app users, while additional features can be offered through a paid subscription.

For future versions, there can be various features such as measuring tool in the app itself to support shopping, incorporating augmented reality to make the overall experience delightful.

Lastly, this application doesn't need to be limited to only the interior or furniture industry. This concept can be applied to any other retail industry.

*Figure 8-10 Poster 7, Future Thinking*



Figure 8-11 Exhibition, Fine Arts Building, University of Alberta

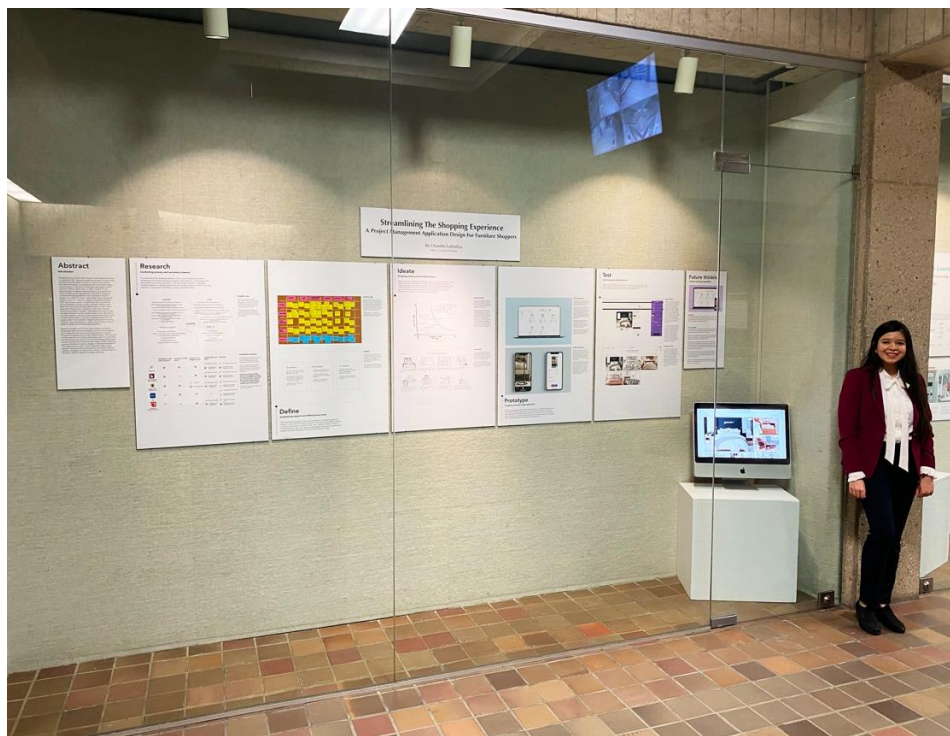


Figure 8-12 Exhibition, Fine Arts Building, University of Alberta

Video Link: [Thesis Project Video](#)