Assignment M3

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***Abstract*—** Search boxes are the dominant discovery paradigm in ecommerce. They are great for many use cases, but there is a class of search tasks for which they present a significant *gulf of execution*. When people don't have the right words to describe what they want, search boxes aren't particularly helpful. This is a particular challenge for people who are in a creative process and are looking for components across a broad variety of categories that they might not have expertise in. I'll focus on the search box on the website of Michaels, an omnichannel retailer. However, this discovery challenge is broad and shared by most ecommerce sites.

1 BRAINSTORMING PLAN

I decided to begin with individual brainstorming. I set aside two 30-minute time periods for the exercise, and separated them by several hours to allow my mind time to relax and form different connections. I organized my brainstorm around 3 questions, each of which were based on my *initial* design requirements: (1) How might the interface help crafters find an item when their language doesn't match that of the online system? (2) How might the interface help crafters immerse themselves in the product offering? And (3) How might the interface help crafters get a sense of scale, texture, and how the items/ materials they see online fit together? I put a floor of 15 ideas for each of the above questions, for a minimum of 45 concepts.

2. BRAINSTORMING EXECUTION

The raw brainstorming data covers 6 handwritten pages and takes up too much space to include here. I've included the raw text in the appendix.

After completing the brainstorming exercise as described above, I had a list of 48 concepts and ideas that might address the design requirements. I decided to combine some of the ideas into related groups. I cut each idea out and placed it in an open area on my office floor, then grouped together ideas that felt similar (Figure 1). I settled on 9 groups, and gave each of them a name (ex: associative

browsing, live help, improved language modeling, etc). The ideas in each group were distinct, but the groupings were based on a similarity in approach. I liked synthesizing the information in this way because it allowed me to connect concepts that came up with different brainstorming prompts.

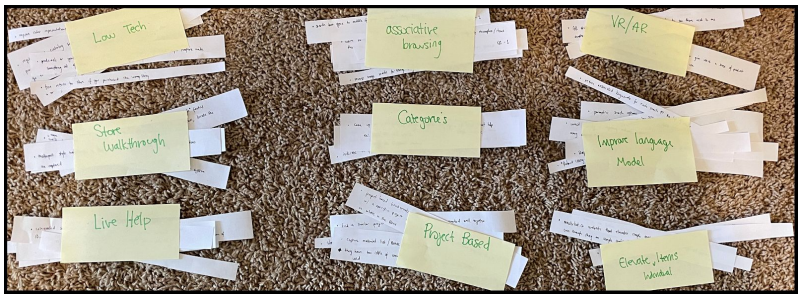


Figure 1— Brainstorming Idea Groupings

2.1 A Change In Focus

At this point, I began to consider which of the concepts would make good prototypes. This proved extremely difficult. The purpose of a prototype is to learn something that will inform the design feedback loop. I was having trouble making selections because my design requirements were too high level and unrelated. They were not connected to a specific task, nor did they describe specific and measurable outcomes of an improved design. Without this, it was difficult to select the right interface to prototype.

I took the time to rework my data inventory and design requirements, which are included in the appendix. The new interface must include *functionality* that will support the user when they encounter difficulty using the Michaels search box to find the item they need. I previously conducted a small experiment where I asked users to find a random item using the Michaels' search box. Ultimate success would mean that users were more successful with this exercise when using the new interface.

Because of the busy context in which my users (who call themselves "crafters") find themselves, the interface should be *usable* and easily *learnable*. It should also be *compatible* with mobile and desktop devices, as crafters use the platforms interchangeably. More detail about these requirements can be found in the appendix.

2.2 Back to Brainstorming

Initially I feared that I would need to completely redo my brainstorming, in light of the new requirements. It turns out that the first question I considered, "How might the interface help crafters find an item when their language doesn't match that of the online system?", mapped very well to my new, more specific, functionality requirement. Upon reflection, I realized that I had enough ideas to work with.

3 SELECTION CRITERIA

3.1 Reverse Image Search

With an improved set of design requirements, it was now much easier to select ideas from my brainstorming. I focused on identifying ideas that would use existing technology to improve at least 3 out of 4 of my requirements: functionality, usability, learnability, and compatibility. First, I decided to prototype the addition of a "reverse image search" feature. This concept would allow users to use an image taken by themselves or borrowed from another source to find similar matches in the product database. I chose this because it applies a broadly used and well understood technology to the challenge experienced by my users, thus fulfilling my functionality requirement. Busy users won't need to spend a lot of time learning something new, or thinking about a complex system. Also, the solution works well on desktop and mobile platforms, an important compatibility concern.

3.2 Live Chat

Next, I decided to prototype a more prominent "live help" feature. If the system notices repeated similar searches (as was common in my needfinding when the user struggled to find what they had in mind), the system will ask the user if they need to chat with a product expert. Michaels currently offers a "Live Chat" function, but its location and description mean that users don't always connect it to the difficulty they are having with their search. This prototype would make the connection more explicit.

I chose to prototype this idea because connecting the user with someone who knows the language of the product catalog is an excellent way to achieve my functionality requirement. If Michaels has the product, the expert will likely

know and can direct them to it. Chat is a common online paradigm, meaning it would not be difficult for the user to learn.

3.3 Improved Search Recommendation Feature

Last, I decided to prototype a more sensible "search recommendations." This would present a set of relevant search terms to the user while they are building their search query. Michaels has a version of this already, but it is poorly implemented. The results are obscured by *project* recommendations that also appear below the search box and they take far too long to load.

I chose to prototype this idea because I think it represents a simple but unrealized opportunity to address my functionality requirement. Shifting a few elements of the interface around would allow users to benefit more from search recommendations, and more often find the item they are seeking. As this technology is a big part of websites like Google, there should be no learning curve for the user. If successful, the interface would be highly usable and save crafters time, a huge benefit considering the busy context they find themselves in.

4 PROTOTYPE 1: REVERSE IMAGE SEARCH

I'll be using a *card prototype* to test the idea of adding a reverse image search to the Michaels' search box. The user will receive a brief prompt before evaluating the prototype.

4.1 Prompt

You've decided to purchase an item from Michaels.com for a craft project you're working on. Upon arriving at the website, you realize that you don't know what it's typically called. Your initial attempts at searching for it are unsuccessful. It turns out, however, that you have an example of what you need on your desk. Given the interface below, what would you do?

4.2 Card Prototype

The numbers below indicate different cards in the interaction. Step 3 has multiple options.

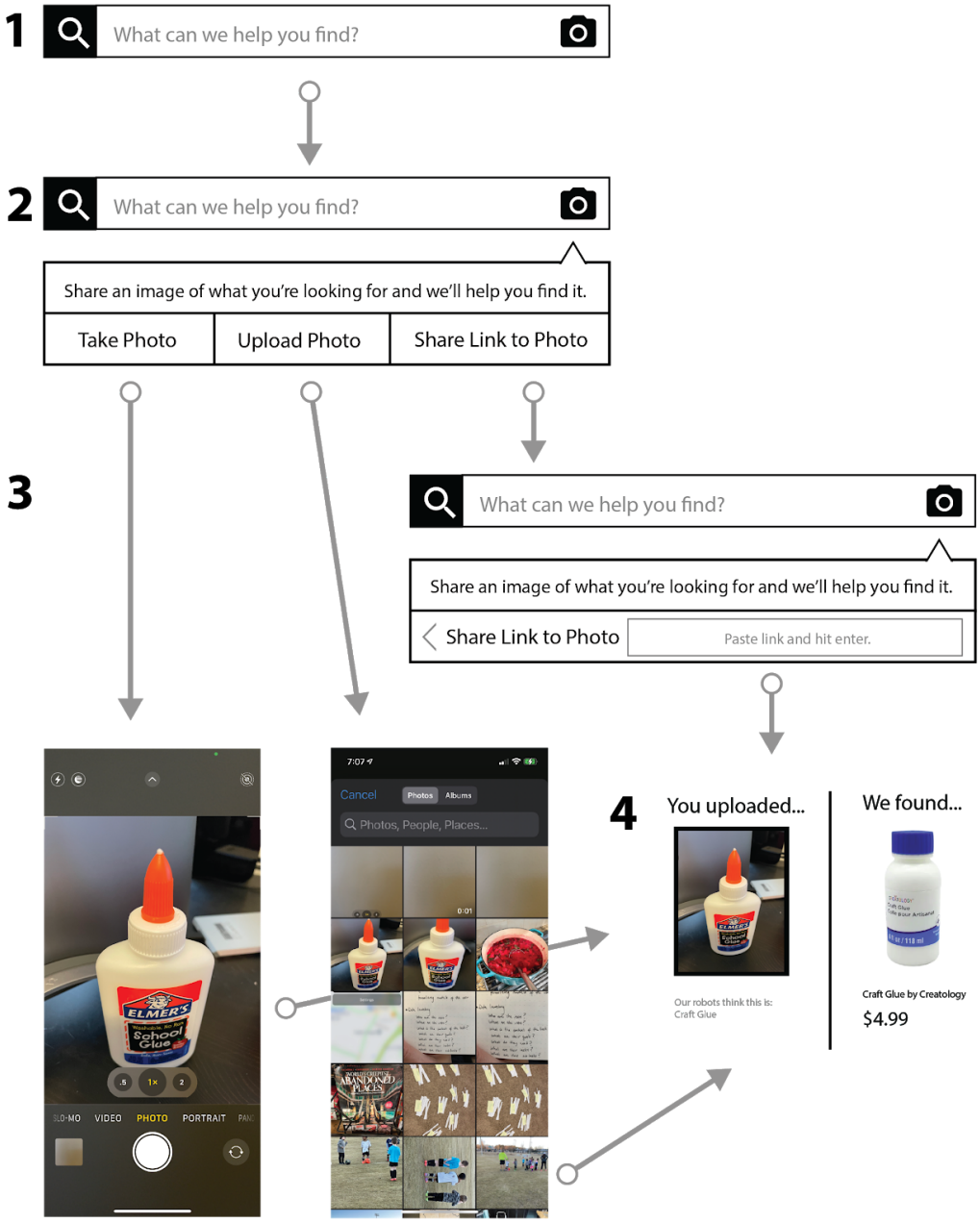


Figure 2— Card Prototype for Image Upload

4.3 Requirement Evaluation

I believe the prototype meets my previously defined design requirements. First, it has added *functionality* that will allow users to locate an item when they lack the vocabulary to describe it. It is *usable* as well. The design is simple and all

options are easy to see and reach. The interface is also *learnable*. It is based on common design conventions for image upload sites. Also, the function of each button is described in the interface. Users should have little trouble figuring out what they need to do.

I chose to present a mobile view for this exercise, but the interface could be easily modified for larger viewports. As a result, the design is *compatible*.

5 PROTOTYPE 2: LIVE CHAT

To test the idea of live chat support during the search process, I'll use a *Wizard of Oz* prototype. The following summarizes the interaction I'll have with the prototype evaluator. First, the evaluator will receive a prompt similar to the one below. Its purpose is to provide context and establish the need for assistance locating a specific product.

5.1 Prompt

You are working on a project with your young daughter. She's recently become a big fan of horses and she'd like to "ride" some of her stuffed horses at home. You're looking for something from Michael's that will allow you to create a simple set of reins. Figure 3a is what you have in mind.

You enter several search terms in the search box at Michaels.com, but none of the results match what you have in mind. You receive the prompt in 3b.

Figure 3— (a) Item to Find (b) User Prompt

5.2 Basic Chat Script (See Appendix for Technical Details)

Product Expert: You seem to be having some trouble finding something. My name is [Insert Name] and I'm a product expert at Michael's. How can I help?

Evaluator: [I would expect the evaluator to explain that they are having trouble finding something.]

Product Expert: What are you making? Can you describe what you are looking for?

Evaluator: [I would expect the evaluator to share some of the story they have been provided, as well as attempt to describe the item they need in their own words.]

Product Expert: [I'd anticipate a back and forth here as the "expert" attempts to clarify what the evaluator finds.] I think I understand now. Let me see what I can find.

Product Expert: Would the following item be useful? [The exchange should end with a link to a useful item or an admission by the expert that Michaels doesn't have what they need.]

5.3 Requirement Evaluation

I believe this prototype meets the majority of the design requirements I developed. Providing an opportunity to chat with a live product expert is a great way of achieving the *functionality* requirement of helping the user to find the product they have in mind, though they might lack the right vocabulary to describe it. Chat is a very common online activity, and I expect that crafters will not have to *learn* anything new to use it successfully. Also, chat interfaces are *compatible* with the mobile and desktop browsers that crafters use when doing online shopping.

I do have some concerns about the prototype when considering its *usability*. Crafters, I learned, generally have busy lives with many competing commitments. It's possible that users might feel that a chat interface would take too much time and be difficult to deal with. I'll be sure to pay attention to this during the prototype conversation.

6 PROTOTYPE 3: IMPROVED SEARCH RECOMMENDATIONS

To test improved search recommendations, I'll be using a simple *wireframe*. As mentioned earlier, Michaels currently has a rudimentary form of this feature, but it is obscured by other information (project recs, categories, etc). The prototype

removes all of this in an effort to support a simpler, less frustrating search process.

6.1 Wireframe

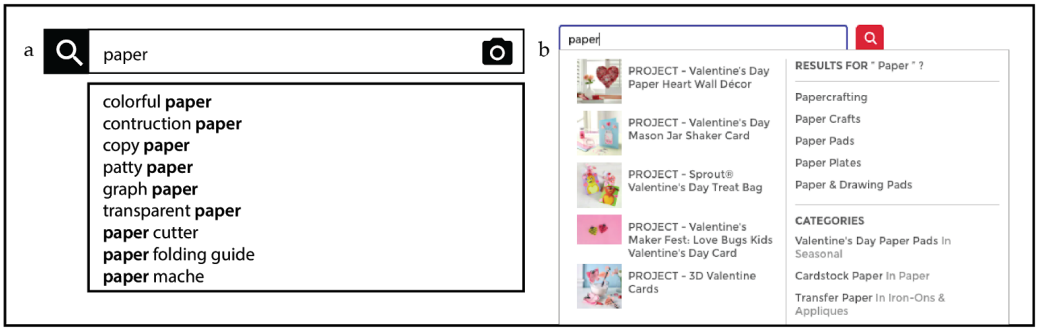


Figure 4 — (a) Proposed Interface Wireframe (b) Current Interface

6.2 Requirement Evaluation

This prototype fulfills my design requirements. It includes *functionality* that will support users when they are unable to find the right words to describe the item they are looking for, primarily by making the recommendations more detailed and prominent. The feature is also *usable* and *learnable*. Users should have no trouble seeing the search suggestions (as they do with the current solution). Given how broadly used this technique is across the web, users will likely be familiar with how to take advantage of useful suggestions. Mobile and desktop implementations of this feature are also possible, eliminating *compatibility* concerns.

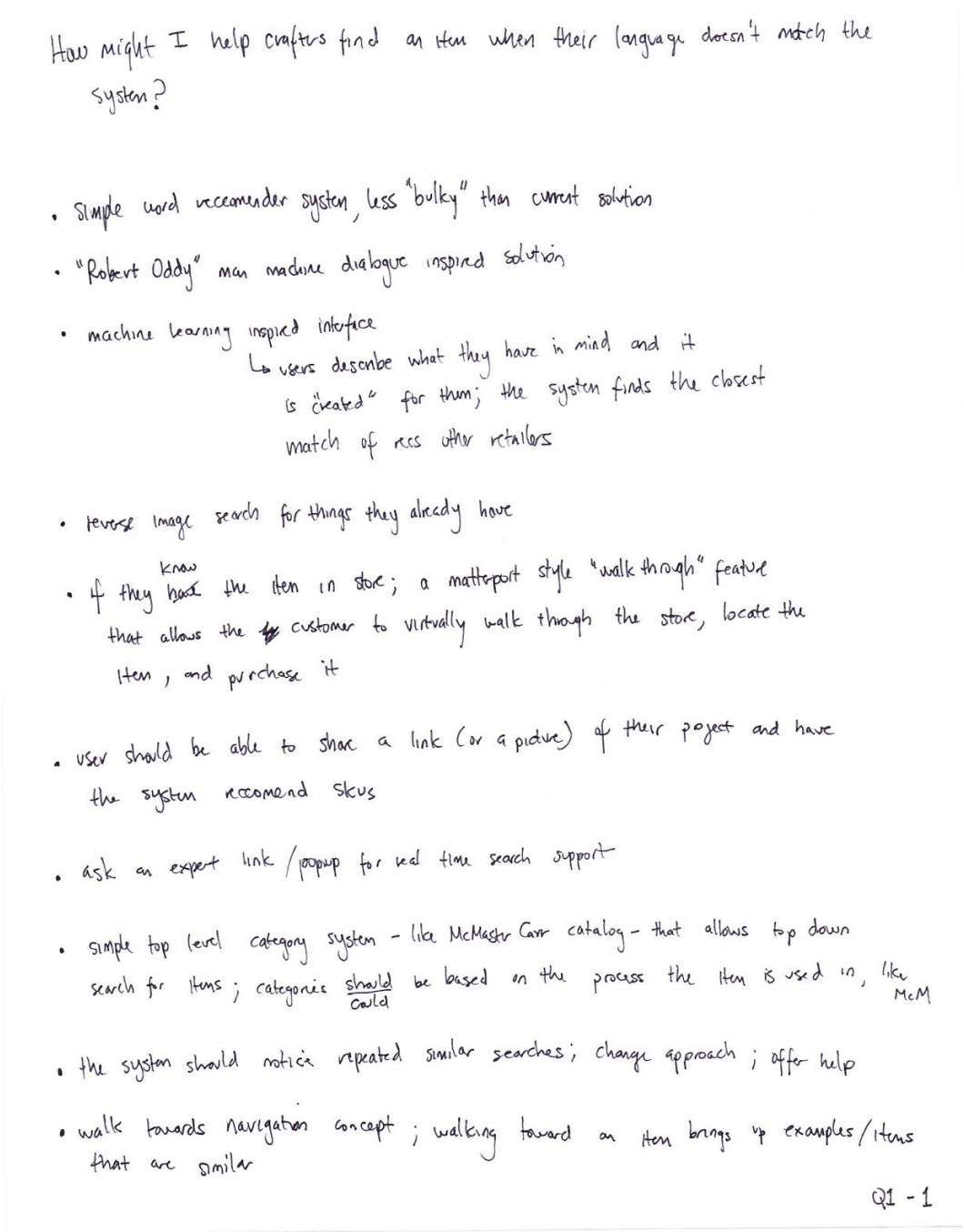
There are some significant trade offs, however. In order to make search recommendations more prominent, I am removing features designed to enhance the search process in other ways, particularly those related to non-language based search (browsing, etc). My needfinding revealed that this type of exploration can be very meaningful to users. While none of the participants in my talk alouds was observed taking advantage of these features, I cannot be sure that they will not be missed by other customers. This is worth asking about specifically in some of the prototype conversations.

7 REFERENCES

Assistant Secretary for Public Affairs. (2020, September 30). System Usability Scale. Usability.gov. https://www.usability.gov/how-to-and-tools/methods/system-usability-scale.html

8 APPENDIX

8.1 Raw Brainstorming Notes



How might I help crafters find an item when their language doesn't match the system?

- simple word recommender system, less "bulky" than current solution
- "Robert Oddy" man machine dialogue inspired solution
- machine learning inspired interface
  - ↳ users describe what they have in mind and it is "created" for them; the system finds the closest match of ress other retailers
- reverse image search for things they already have
- if they know the item in store; a matterport style "walk through" feature that allows the customer to virtually walk through the store, locate the item, and purchase it
- user should be able to share a link (or a picture) of their poject and have the system recomend skus
- ask an expert link / popup for real time search support
- simple top level category system - like McMaster Carr catalog - that allows top down search for items; categories should / could be based on the process the item is used in, like McM
- the system should notice repeated similar searches; change approach; offer help
- walk towards navigation concept; walking toward an item brings up examples / items that are similar

Q1 - 1

- top down store view that allows navigation to particular area
- draw the item and have machine learning find the closest match
- invest heavily in improving natural language search system, should recognize many common names, or possible names, for each sku
- integrated social media lookup; enable users to ask for help IDing an item w/ wisdom from the crowd; like reddit r/what is this thing
- return associated keywords for each search @ the top of results
- VR browsing experience; find it by walking around instead
- search engine scans all craft websites, then refers you to them if we dont have it

Q1-2

How might I help crafters immerse themselves in the product offering?

- Matterport style walkthrough of store shelves; updated weekly to ensure seasonal items are captured
- VR/AR walkthrough - a la the matrix "Guns" scene - to give users a sense of product space; literally immerse them in the items they can use
- Same energy style navigation process; pinterest style navigation process
- regular themed catalog sent to house yearly w/ comprehensive product list and project ideas; like a Bible for super crafters; has exclusivity because it doesn't go to everyone.
- tight integration w/ social networks (side panel; inspire me button) that shows scrolling list of projects; parts people might use
- surprise me button; a la google
- podcast or youtube series; pick random products and have super crafters make something out of them
- masterlist.co website that elevates simple materials; treats them like art pieces even though they are simple craft items
- search box goes to middle of page; generate image based responses based on entered words

Q2 - 1

- top down store view that allows customer to leverage their experience w/ store
- "maze walk toward" navigation system; tree search system, pick an item, the system shows the 10 most similar items, recursively
- weekly email w/ interesting product offerings, seasonal offerings, project ideas
- random item feature; show a random craft material w/ info about its use or project ideas
- item of the day feature (similar to above)
- project based bread crumb search; show an item user needs to find; starting w/ a specific project and its BOM, link between different projects based on whats in the BOM

Q2 - 2

How might I help crafters get a sense of scale, texture, and how things fit together?

- matterport style walkthough of store so that users get a rough sense of relative scale of items
- AR style product projection; place items on your desk to see them next to one another
- virtual product build/test playground → allow customers to construct crafts virtually using VR or more traditional medium
- capture material list / BOMs / project descriptions; let people know if they have too little of something given the way items in the basket are used
- come up w/ classification scheme; texture language; w/ icons that help people compare
  ex: feels like silk scarf
  rough like 5 o'clock shadow
- indicate in product description the adhesives or paints that work w/ material
- show picture of the item used in a project w/ every search
- haptic glove interface to allow tactile experience
- free return to store if you purchased the wrong thing
- ask a product expert if two things will work together using chat feature or video call

Q3 - 1

- shop w/ a friend features to get sense of what other people think; wisdom of crowds
- find a similar project search to see if the materials worked well together in other efforts
- similar texture search; feels like ...
- scale search; search by size envelope
- improve color representations to better match real life
- parametric search options that allow queries based on natural language ex: feels like ——
  complements ——
  about the size of ——

along w/ traditional queries

Q3 - 2

8.2 Revised Data Inventory

Data Inventory

Who are my users? My users are people who often complete several projects per year that require craft or art supplies. They sometimes describe themselves as "crafters" or "makers." Though certain demographic groups are overrepresented amongst crafters, I think it makes more sense to define this group by what they do. This allows me to capture individuals that might defy broad demographic trends.

(When and) Where are my users? Crafters search for craft supplies at various times: (1) during available time, (2) at the moment the need occurs to them, or (3) when they are inspired by something they've found (often online). The specific location (the "where") varies depending on the above. They often do basic search tasks on a mobile device, then shift to a computer if the project is more substantial.

What is the context of the task? Crafters tend to have busy lives and may juggle family and professional commitments. They frequently have children. These competing responsibilities should be considered when designing interfaces as there might be competition for their limited attention.

What are their goals? The goal of these crafters is to construct something that will serve a purpose or bring them (or someone in their community) satisfaction. The items they purchase enable them to do this.

What do they need? Crafters need the process of making a purchase to be as simple as possible. A painful supply acquisition process can delay or derail a project.

What are their tasks? Their primary task is to get the items they need for a given craft project. Sometimes this is a challenge because they don't necessarily have the right words to describe what they have in mind. When their language doesn't match the language of the system, the task is difficult to accomplish.

What are their subtasks? There are numerous subtasks associated with the primary task of getting the items they need. These include constructing a search query, finding the right item, adding the item to the cart, and making the purchase.

8.3 Revised Requirements

My needfinding revealed that a big problem with purchasing crafts online occurs when the user's language doesn't match that of the system. Sometimes crafters can't come up with the words they need in order to reveal the product they want.

For my design requirements, I am focused on *functionality*, *usability*, and *learnability*. The new interface must include functionality that will support the user when they encounter difficulty using the Michaels search box to find the item they need. I previously conducted a small experiment where I asked users to find a random item they weren't familiar with using the Michaels' search box. A successful interface will more often enable the user to find the item they have in mind, even when they lack the system's language.

Usability is a key concern as well. Crafters should be able to easily discover and activate any support functionality that is added to the system. Ideally, the new support would allow the user to successfully locate the item they are seeking, making it more usable. We can measure this by comparing the amount of time it takes for people to locate the items they want. As well, I can use more objective measures like the System Usability Scale (Assistant Secretary for Public Affairs, 2020).

Because of the busy context in which crafters find themselves, the interface should be intuitive and easily *learnable*. Leverage existing design paradigms should make this easier. The best solutions will require no learning at all.

It is also worth mentioning *compatibility*. My needfinding revealed that crafters tend to shop on mobile or desktop devices, whichever device is most convenient at the time. The new interface should also be compatible with mobile and desktop devices, as users use the platforms interchangeably.

8.4 Live Chat Wizard of Oz Prototype Note

The simulated chat session will occur in a shared google doc. Its ability to have simultaneous editors can help it function as a low fidelity chat interface. To simulate a real chat session, the "product expert" will not have prior knowledge of the story or the item the evaluator is seeking.