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Digital Menu Imagery: What Users Actually Want

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Abstract

Through the months of June and August of 2022, the author conducted a research study to explore the effects of images on digital restaurant menus. While most studies aim to prove that including more images on a menu is beneficial to brand and sales, this study aims to focus more on user preferences by studying the decision-making process, attention-grabbers, and what makes a menu visually attractive to users.

The study invited five participants and investigated user preference by asking users to rank a variety of menu prototypes of sushi restaurants, particularly Kobe Teppanyaki. Prototypes varied in the number of images used, the quality of images, and the shape of images. The results demonstrated that users gravitate to menus that include more images than none but were particular about the quality of the image in relation to the rest of the menu. Users of this study proved that the number of images on a menu depends on the food being offered and the balance of titles and descriptions. The idea of imagery versus text invokes a need for more research to be conducted in the future.

Files Used for Testing

https://drive.google.com/drive/folders/1GiaXOpV-V22tRN3a8XVJUMFq_6hmVnLI?usp=sharing

Keywords

Usability, user experience, imagery, menu, restaurant, sushi, digital menu, visual design, decision-making, prototype ranking

Introduction

The underappreciated link that connects a restaurant with their customers is none other than the menu. Whether by paper or digitally in-hand, the menu is responsible for keeping businesses alive by informing and enticing its customers with unique and delectable tastes. A restaurant simply would not survive without a menu to communicate and market their products in a way that matches their brand. As technology has advanced, menus have taken a new digital form to be easily accessible in the hands of anyone, anytime and anywhere. Despite the shift from in-house paper menus to in-hand digital menus, the key components (images, titles, descriptions, prices, etc.) still apply. Each component plays a part in persuading a user to buy its product, and studies show that images in particular play a crucial role. On that note, what is it about images that make them such important persuaders?

In order to fully understand how the use of images affects a consumer, it is important to talk straight science. For starters, the need for food all comes down to the chemistry make-up in your body. The Team of FreshBytes (2020) explains that ghrelin - a hormone in charge of telling your brain how much food you desire - easily enters your bloodstream by simply seeing an image of food. This sudden release results in an increase in appetite, and suddenly you find your stomach growling by simply looking at an image. From a menu perspective, Voicu (2020) states that people only retain 10% of the information they read or hear. By simply adding a visual to the object in question, your brain is now more likely to remember 65% of the incoming information. As such, 82% of people are more likely to purchase a meal based completely off the picture on the menu.

Science aside, imagery is vital to storytelling as it sets first impressions, builds trust and credibility, and maintains a brand. Voicu (2020) adds that images cater to the consumer's emotions by triggering an immediate response in the subconscious for desire. When a customer sees an appetizing image of food, they immediately desire to taste it as soon as possible, which leads to an increase in orders and restaurant visits. Meanwhile, the old phrase "A picture is worth a thousand words" still stands strong today; not only do images tell a story, but images additionally help speak the international language. By including an image next to your product, the message you are trying to send becomes universal, thereby eliminating the language barrier. To say the least, images prove to be a greater storyteller than words.

If there are so many reasons both physically and emotionally that images help stimulate the desire for food, then why is there a need for additional research? Why doesn't every menu display as many images as possible in order to increase customers' appetite in an attempt to increase sales? While some research shows that an increase in images on a menu leads to positive results in customer satisfaction, Hou et. al (2016) provided research that shows this may not always be the case. Hou (2016) stated that poorly rendered images can cause more unease than hunger, and that there comes a point where using too many images can cause redundancy. This proves the notion that not all visuals have a positive effect.

Clearly, the majority of studies have done an exceptional job of showing that a menu benefits from images, but these studies may fail to research the other possible negative effects that customers may experience as well. Many questions still remain; for example, how many images qualify as "too many"? Do certain food items need images more than others? Does including more images of food increase consumer approval and their likelihood to order the product? Does changing the style, quality or shape of the image have any effect? Ultimately, how does the use of images in a menu impact the decision of users? The purpose of this research is to answer the questions that have yet to be answered, as well as to discover new ideas that could improve the realm of user research.

Methods

Sample

Sampling Procedure Method

Due to the ubiquitous nature of menus, the majority of people have used a menu at some point in their life, therefore there is not a specific demographic of people that is required. However,

for this study there are a couple of attributes that could prove more useful than others. For one, participants who have had experience using digital menus or ordering online will be the main focus. Additionally, it would prove beneficial to include participants that eat out on or more than the average person, and those who tend to order for more than just themselves (for example, parents with children). Participants were chosen from a demographic survey that was sent prior and contacted individually.

Sample Description

The sample consisted of five female participants who varied in ages between 16-40. While four of the participants classified themselves as white, one classified as African American and another is the mother of two African children who immigrated to the US at a young age. Two of the participants were current college students who held jobs at the Davis County Library and the Davis School District as a Special Education caretaker. Two more participants were mothers of three kids, where one owns a business for Utah Disability Services, and the other a full-time teacher for Davis School District. The final participant is a current high school student. Despite their different backgrounds, each expressed that they eat out rather frequently and prefer to look at online menus ahead of time.

External Validity Considerations

It is worthy to note that because all individuals were selected by the researcher, there is a possibility that bias may be present and has the potential to alter the results of the study. For example, due to the time constraints of this project and the need to conduct longer test methods than questionnaires, the sample size is smaller than preferred. Additionally, the small and narrow sample size consists of all females since the majority of individuals interested in the study were female.

Measurement

Measures & Construction of Measures

To gather general opinions from potential participants, a survey was created. Seeing as demographics such as age, gender, and occupation does not necessarily apply to this study, the survey questions focused on the user's experience with dining in general. Such questions include the following.

1. How often do you eat at/order from a restaurant per week?
2. How do you prefer to dine out? (Options included sit down dine in, drive through, order online and pickup, delivery, phone call pickup, etc.)
3. Do you prefer to order online over ordering in person?

The following questions were then asked to ask more specifically about ordering online.

1. Have you used a third-party company to order food online? (Such as GrubHub or DoorDash.)
2. If you answered yes, do you prefer to order using said third-party, or directly from the restaurant's website?
3. How would you rate your experience ordering online? (Open field.)

Lastly, users were asked about their status (single, high school student, married, single with children, married with children, etc.). The purpose of this was to see if those with children would have a different opinion compared to those who are single as they will have to feed and provide for multiple household members.

While the majority of questions used a rating scale system to provide more concrete data, each question provided a "Other" option to ensure that all possibilities can be considered. On the other hand, the question marked with "open field" allowed the user to provide their own written response.

Reliability and Validity

The purpose of these questions was simply to allow the researcher to choose participants to use in this study and to gain a brief understanding of the scope as a whole. Therefore, these questions were designed to be more generic in asking the user about their restaurant experience itself. For example, the first question "How often do you eat at/order from a restaurant per week?" is not to study if/how menu images affect the frequency users eat out,

but rather to gather user information that better matches the sample we are looking for. Users that are selected for the study will later be asked more in-depth questions about restaurant menus, images, food quality, and more.

Design and Procedures

Design

A test study was designed to guide participants through a series of tasks and questions. Said study consisted of six tasks and a series of follow up questions to accompany each task. Each task was designed to address the research question of how menu images will affect a user's decisions. These tasks appropriately measured the reactions and opinions the users have as they navigate various menu options.

Internal Validity

While this study focused on only a couple of restaurants for control, it is important to note that one menu cannot speak for them all. In other words, the results found during a study for a high-end, sit-down restaurant could provide different results than that of a fast-food drive through restaurant. Additionally, users can have various other factors that affect their decision, such as food preferences, dietary needs, restaurant service, etc. This study aims to investigate an overall result on user preference of menu images, not the food itself.

Description of Procedure

Users were invited via Zoom or in-person (depending on scheduling circumstance) and were either provided a link or given a device to view the necessary files and websites. After getting to know the user with some warm-up questions, the users were guided through a series of six tasks. The first two tasks guide users through two restaurant websites where users are asked to choose what they would like to order. The remaining tasks provided the users with a variety of different prototypes for each restaurant that demonstrate a difference in image quantity, quality, shape, layout, and more. Users are then asked to sort the prototypes into what they personally define as the most attractive, with number one being the prototype they found to be the best.

After each task, the users were asked to validate their response by describing what led them to make the decision. A couple of other questions are asked in pursuit to better learn from the user about their decision. When the tasks are complete, a new series of follow-up questions will be asked about the participant's experience as a whole, as well as any additional comments or questions they may hold.

Results

Through this study, it was interesting how some results lined with past studies while others did not. As hoped, the discussions and results generated with users helped reveal what consumers really feel about images on a menu, and what things they look for in and beyond images.

Freestyle Menu Conversation

For the first two tasks of this study, users were asked to navigate an online menu for Kobe Teppanyaki (an Asian and sushi restaurant with a variety of images on their menu) and Tucanos (a Brazilian grill with a menu featuring foreign names and one image per section of their menu). Users were then asked to rank the level of difficulty they faced when it came to making a decision on a scale of one to five, with one being the easiest and five being the hardest. The results of this difficulty are demonstrated in Figure 1.

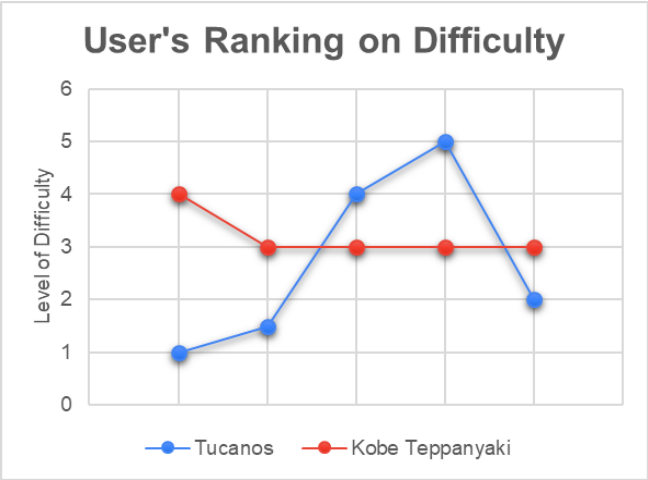

Figure 1. Menu Browsing - User's Experience of Difficulty

On average, the level of difficulty users experienced when selecting from Kobe Teppanyaki was 3.2, and Tucanos 2.7. Despite having a more fluctuating pattern with some users finding navigating the site more difficult than others, Tucanos overall proved to have a lower difficulty average than Kobe, which means users found it easier to make a decision when ordering their food. However, to put it in perspective, if previous studies showed that including more images in a menu is better, then why did Kobe fail to lower the difficulty rate when it had more images than Tucanos?

The answer lies within the menu descriptions; all five users expressed their interest in the descriptions and how they helped more than the images did. Users expressed comments about how descriptions are more effective at defining unfamiliar foods, explaining what sides are offered with entrées, and using cost to infer what the quality of the meal will be. Descriptions not only help define *unfamiliar* terms in a foreign meal title, but they also aid in building trust in the meal by providing visualization for *familiar* terms; for example, one user read a description for a meal including chicken and said, "I like chicken, so this must be good!". Descriptions do not only explain the meal itself, but additional sides and perks as well. As such, a lot of users complained that Kobe's entrée menu did not specify whether it comes with sides such as rice or vegetables, and therefore did not want to risk spending large amounts of money for only one item. As hypothesized, affordability was the number one value on the user's list, as the majority of users selected were either college students on a budget or parents supporting more than themselves. Each user took the time to look at the price on the description of the meal, which gave them an idea of how nice the meal was going to be in hopes that they were getting more for their buck. If the price was higher than what they wished to spend they quickly moved on to the next section, even if there were images to visualize the quality of the meal.

Of course, images still played an important role in this ranking as well. One user in particular who ranked Tucanos with a difficulty of one explained that having even just one image helped, saying "All I needed was one little visual to see what it is going to look like". Users expressed that having a single juicy, mouth-watering image helped develop a craving more than having multiple images attempting to explain everything that was offered. Despite the popular belief that more images are key, sometimes having one major selling point that speaks for itself can entice a user to begin a craving and begin visualizing things on their own. On the other hand, one user who was the minor outlier by ranking Tucanos a five explained that the reason they found the page difficult to navigate was the fact that the image took up half the screen, making the font smaller and harder to read. This notion of image versus text supports the idea that although images have the power to speak louder than words, they also have the ability to speak too loud to where it overshadows the products being offered to begin with. With this in mind, the next section of results demonstrates the importance of finding the right kind of balance between image and description that users are looking for.

Prototype Ranking

For tasks four through six, users were asked to rank a variety of prototypes created by the researcher. Each task included up to six files that were named after Greek symbols (such as delta, gamma, alpha, etc.) to randomize the files. Users then ranked each file by what they believed to be best as first, worst as last, and all those in between. Results were displayed in tables such as Table 1-1 where you can view what files each user ranked in what order. For example, you can see that user E-5 ranked BETA to be the number one prototype, whereas user S-4 placed BETA in fifth place, ranking it last.

To determine the overall average ranking each file received "points" on each ranking they placed, and the total was divided by the number of users (five in this case) to result in the average ranking. For example, the file KAPPA was placed first by user J-1, giving the file one point so far. Since KAPPA was ranked fourth by B-2, first by M-3 and S-4, and second by E-5, KAPPA now holds a total of nine points (1+4+1+1+2 respectively). By dividing this total by the number of users (five), KAPPA holds an average ranking of 1.8. The average ranking of each file is held in a separate table (see Table 1-2) where the winning prototype was analyzed.

Number of Images

Table 1-1. Ranking Prototypes Task 3 - Kobe Teppanyaki Menu

User ID	First	Second	Third	Fourth	Fifth
J-1	KAPPA	ALPHA	DELTA	GAMMA	BETA
B-2	DELTA	BETA	GAMMA	KAPPA	ALPHA
M-3	KAPPA	BETA	ALPHA	DELTA	GAMMA
S-4	KAPPA	GAMMA	DELTA	ALPHA	BETA
E-5	BETA	KAPPA	ALPHA	DELTA	GAMMA

Results were tracked in the following table by file name. Each row (labeled by user ID) demonstrates the ranking given by the corresponding user. Average ranking is calculated in Table 1-2.

Table 1-2. Task 3 Kobe Teppanyaki Average Ranking

	First	Second	Third	Fourth	Fifth
File Name	KAPPA	DELTA	BETA	ALPHA	GAMMA
Average	1.8	3	3	3.4	3.8

Average ranking was calculated using data from Table 1-1. Each file gets a "point" for each place they hold (one point for first place, five points for fifth place, etc.) and the total is divided by five to give the average ranking.

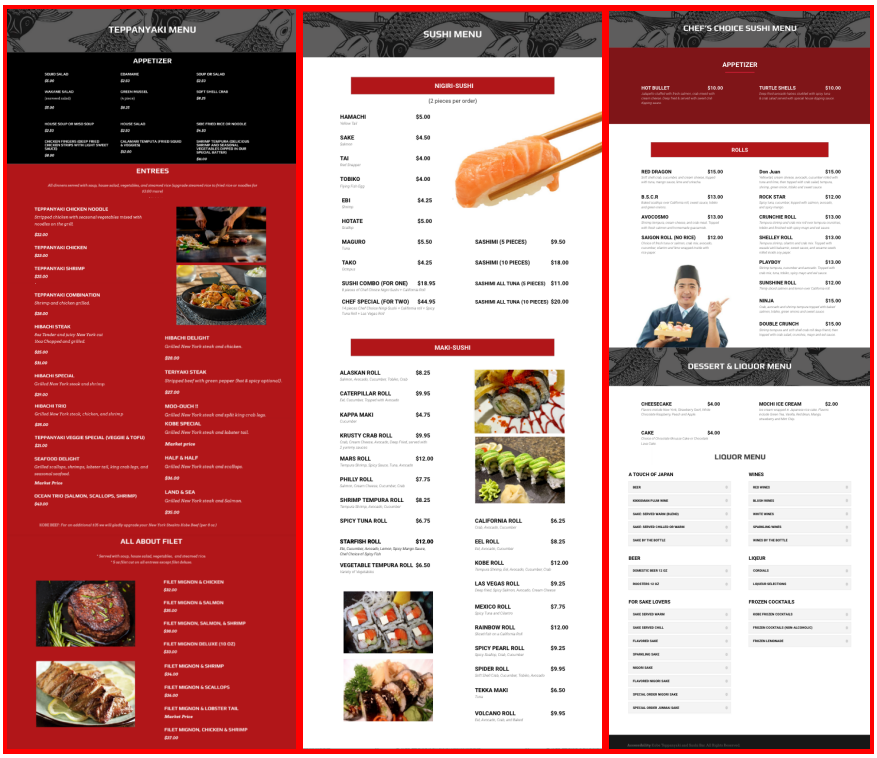

Figure 2. Kobe Teppanyaki prototype KAPPA which ranked first in Task 3. The menu was a single-scrolling webpage, but for the sake of space for this report it was divided into three sections side-by-side. Prototype consisted of images in both the entrée section and sushi section but did not include a picture on every sushi option as it did on the original website.

The purpose of this task was to focus on the number of images that a restaurant should include on their menu. Should it include an image for every meal item? Should it include at least one image per section? For this task, five prototypes were shown that varied in the number of images: one with images in the entrée section but not in the sushi section, another with images in the sushi section but not in the entrée section, one with a mix of both, another with no images at all, and the last being the original menu from Kobe Teppanyaki. The prototype users preferred over all others was KAPPA (see Figure 2) which included images in both the entrée and sushi sections, but not for every single sushi option.

First, users expressed that they had no interest in the menu that had no images at all. One user gave the example of the online shopping company Amazon, and how uncomfortable it would be to purchase something from the website if they did not have an image to advertise what it looked like and if they were getting what they truly wanted. "I'm not inclined to spend $49 on something I can't even see what it is. Show me what it looks like and entice me to want to go there and want to spend money." With sushi especially, users found it important to show more pictures than not because certain foods include the same ingredients with different combination styles. Additionally, including images can improve efficiency and navigation by decreasing the amount of time users spend reading descriptions.

Additionally, users expressed how some images are necessary to describe and explain certain dishes while others do not. With the matter of sushi, four out of the five users were familiar with sushi and did not feel a need to have an image explaining what nigiri sushi is. Yet, two out of those four users explained that while they have had sushi before, they do not know all the names of nigiri (such as ebi, tobiko and hamachi) and would appreciate visual representation to provide a definition. As a compromise, users suggested that the restaurant include a single image of a platter full of nigiri instead of one image per sushi. Lastly, although having an image on every sushi option was not necessarily a bad thing, it felt unbalanced because there were

originally no images in the entrée section. Users appreciate having balance in the menu, otherwise the images that stand out will be what the user assumes is the highlight the restaurant is offering.

Images of Food vs. Images of Experience

Table 2. Task 4 Entrée Menu Average Ranking

	First	**Second**	**Third**	**Fourth**	**Fifth**
File Name	DELTA	KAPPA	GAMMA	BETA	ALPHA
Average	2.2	2.4	2.8	3.6	4

Figure 3. File DELTA that ranked first in Task 4. Each entrée menu section includes at least one image, however each image changes in shape, style, and quality. DELTA included two images that were both circular instead of rectangular.

The majority of menus have all followed the basic rules of design and commonly choose to stick with grid layouts and rectangular images. However, others choose a more stylistic approach and customize their images to a variety of shapes and image formats. For this task, prototypes varied in sizes, shapes, styles, and types of images, and users noticed a difference. The first thing that caught the user's attention was the natural structure of the menu. While having circular images in the top-ranking prototype (see Figure 3) caught a lot of the user's attention, four out of the five users expressed that the main reason they liked this prototype was the layout. Users explained that including an image on each side of the menu created a sense of balance, unlike the other prototypes that include only one or two images. Additionally, some users expressed that having circular images takes away that "sharp" feeling that most grid-layouts have. Despite popular belief, restaurants could benefit from using unique styles and shapes to grab the attention of their user, as long as it creates a sense of balance and comfortability that users are looking for.

Naturally, the image that is being displayed is what really sets aside a brand. For this task, prototypes varied in images of poor-quality food on plastic storage containers, high-quality food, pictures taken inside the restaurant, chefs cooking on large grills, and customers eating at the restaurant. As such, this created a concept of images of food vs images of experience. One user mentioned "You are paying for the experience, and I need to know what that experience is" as they expressed an appreciation for the images of the inside of the restaurant. On the other hand, another user expressed that they only wished to see images of the food, saying that "you want images of food to be the ultimate standout, and have the experience of photos be the supporting characters". In summary, it is important for restaurants to consider what kind of experience they want to portray. According to users, the winning prototype (Figure 3) best combined images of product and images of experience by including high-quality images of the food, as well as the food as it's being cooked on a teppanyaki grill by the hands of its chief.

Images vs. Descriptions

Table 3. Task 5 Chick-Fil-A Average Ranking

	First	**Second**	**Third**
File Name	GAMMA	BETA	ALPHA
Average	1.6	1.6	2.8

Average ranking of the Chick-Fil-A's menu prototypes. The tiebreaker for first place was decided by the file that held first place the most, with three out of the five users choosing GAMMA as their first choice.

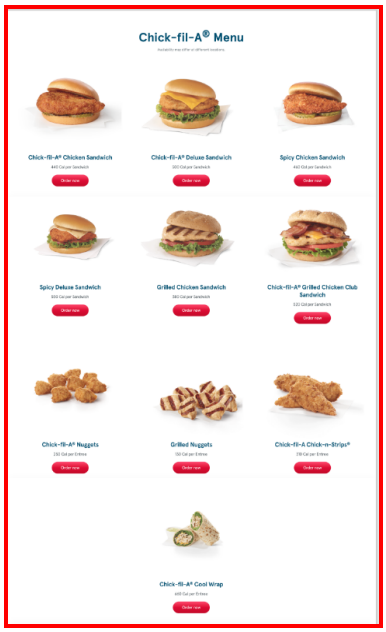

Figure 4. Prototype GAMMA of Chick-Fil-A menu used for Task 5.

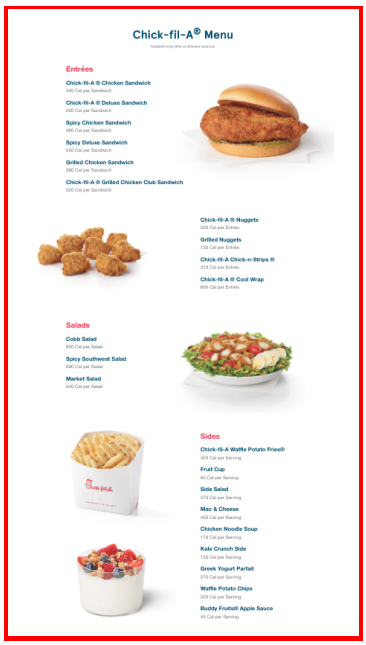

Figure 5. Prototype BETA of Chick-Fil-A menu used for Task 5.

For Task 5 users compared three prototypes of Chick-Fil-A, where one menu included an image on each menu item (see Figure 4), another included a few images per section (see Figure 5) and another had no images at all. Between these three prototypes, the two that tied in first were the prototypes that included images (see Table 3). Originally, the author hypothesized that

users would not want a picture on every single menu due to their feedback on previous sushi menus, yet the reason that the menus with more images were preferred over no images was not because of the number of images, but because of the descriptions. In these prototypes, Chick-Fil-A does not include a description of ingredients because the images do the talking. Users immediately took notice, and as such all users expressed appreciation for the images in one way or another. One user in particular confidently claimed that "If it doesn't have a description, then there needs to be a picture."

For starters, four out of the five users expressed that the menu without pictures was simply very boring and had no description to help describe what the meal consisted of. As far as a fast-food restaurant menu goes, users also explained that they already have background knowledge of what common fast-food items consist of (such as burgers, sandwiches, and pizzas) and how most menu items are variations of the same item. Therefore, some menu items can use images instead of descriptions to visually display those differences instead of redundantly writing each and every ingredient. In this case Chick-Fil-A uses images to show those little details, such as showing the difference of the regular and "Deluxe" options of sandwiches by visually displaying the cheese, lettuce and tomato that the regular does not have.

One user in particular with this task showed a unique interest and perspective when it came to food cravings and attention grabbing. Whilst looking through the menu with the most images (see Figure 4) this user explained how they were developing a craving for the chicken nuggets when they were not originally hungry. While past studies have already shown that users will develop cravings based on images, this user further proved that images can cause a craving for foods they have never had before. When this user scrolled through the bottom of the menu they suddenly exclaimed, "They have waffle potato chips?! I want some! I didn't know this was a thing!" Her enthusiasm was captivating as she demonstrated how images not only help food items to pop-out on the menu, but also develop a curiosity and hunger for said items even if they had never experienced them before.

The last thing that is of importance to note with this prototype was that users not only look for a description of ingredients or price, but of other important factors as well. Such factors mentioned by users themselves included calorie counts, list of possible allergies, organized section headers to make the menu easier to follow, and the possible addition of numbered menu items that allow easier ordering for non-English speakers.

Image Quality and Trust

Table 4. Task 6 Sushi Menu Average Ranking

	First	**Second***	**Third***	**Fourth**	**Fifth**	**Sixth**
File Name	OMICRON	ALPHA	GAMMA	BETA	KAPPA	DELTA
Average	1.2	3.2	3.2	3.4	4.6	5.4

Average ranking of the various sushi menus.
*The tie between second and third was decided due to how ALPHA held second place in two out of the five users' rankings while GAMMA held places in both the first place and last place during the study, making it less consistent than ALPHA.

Figure 6. Prototype OMICRON used for Task 6, ranked first by users.

Figure 7. Prototype DELTA used for Task 6, ranked last by users.

While establishing a brand, it is important for a restaurant to consider not only how their menus market the product they are trying to sell, but how it markets their restaurant as a whole. Images have the potential to build or dissolve trust, which is what this task surprisingly demonstrated. For Task 6, users ranked sushi menus from a variety of sushi restaurants. Despite all restaurants serving similar kinds of food, each restaurant marketed their products in different ways that reflected their style and vibe. As such, all factors of menus that were mentioned before in this report (number of images, quality of images, images vs. description) all come together to work in harmony (or disharmony) to try to appeal to their customers.

Some restaurants exceeded in building trust with their users while others not so much. To the author's surprise, OMICRON (see Figure 6) was found to be the most trustworthy to the users. Users expressed that although they were a little cautious about the use of circular images at first glance, OMICRON was the most attention-grabbing and engaging since it correctly matched the vibe that the restaurant seemed to be going for. For those users who did not care for the "childish" style, they still voted highly for OMICRON instrumentally because the pictures of sushi themselves seemed to be more appetizing than other menus they have seen. Therefore, displaying quality images that build authenticity is fundamental for business.

On the opposite end of the spectrum, users were quick to express a dislike (and a lower ranking) to the menus where images failed to look appetizing. Many users expressed a dislike for DELTA (see Figure 7) by commenting things such as "everything on this menu looks like an insect", "this looks hand-drawn" or "it feels like an old catalog". Not only did users feel unsafe about the food being marketed, but they also expressed a caution for the restaurant itself, saying that it looks like a hole-in-the-wall place that is about to be put out of business. Additionally, more than one user expressed how one of the menus (KAPPA) looked like images from a video game, making it feel fake and inauthentic. As a result, this task significantly shows that the first thing users look for in a restaurant is trust and authenticity.

Conclusion

This study has explored what users truly look for in a digital menu. Unlike popular belief, adding more images does not always mean better. The results of user feedback show that users not only look at images as a form of stimulus and craving, but as a description and representation. As such, users want images to be of greater quality to build trust and to demonstrate the experience that they will have. Even more so, users believe that images and descriptions go hand in hand; consequently, if a meal has no image, then there needs to be a clearly defined description. The opposite also applies, that if a meal option has no description, then there needs to be a high-quality image that portrays what the restaurant is trying to sell. In conclusion, it is just as important for a restaurant to consider the image quality, balance between photograph and description, and the sense of trust that images provide over just the number of images that they include on their menu.

Despite the results that were found in this study, there is still a need for additional research. In addition to what was discussed in this study, there were a variety of other topics that users addressed. These topics include the following:

1. The importance of respectfully speaking to your audience since people come from different cultural backgrounds. Therefore, some people may understand certain foods while others do not.
2. The possibility of a generation gap where certain age demographics prefer certain foods, images, or restaurants over others. This was considered in Task 6 when some of the restaurants that were ranked the best by older users were chosen as the lowest ranked choices by the younger users.
3. The difference between online menus and in person menus. Various users expressed how their opinions on images may change depending on if they were in person to see what other people were eating or if they had the ability to ask the employees questions about the meal. It also depends on the amount of time users have to scroll through a lengthy menu, how rushed they are feeling, and other outside factors.

Needless to say, more research is needed on the matter in order to better understand the potential that menu images hold.

Recommendations for Usability Practitioners

It is recommended that in order to further the study of this topic, users should consider the following suggestions that resulted from this project:

- Recruit more than a sufficient number of participants to increase diversity, cultural backgrounds, and statistical validity.
- Test a variety of different age groups and dedicate a portion of your scope to discover a possible correlation between age and image/restaurant preferences.
- Conduct a study with a wide variety of restaurants, varying from cultural foods, high-end restaurants vs. fast food chains, and more.
- Consider widening the study with a greater variety of image styles, shapes, and colors.

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