



Healthcare and Ocular Services

## **1. Introduction**

In today's fast-paced world, quality vision care is crucial, yet many individuals face barriers to accessing timely eye examinations and obtaining suitable eyeglasses. Traditional methods of vision assessment can be inconvenient and prone to inaccuracies, leading to dissatisfaction with visual correction. Additionally, navigating the eyeglass selection and purchasing process often requires multiple visits to different providers, further exacerbating the challenges.

It is crucial to solve these challenges because unobstructed vision is essential for daily functioning and overall well-being. Poor vision can negatively impact productivity, safety, and quality of life, hindering individuals' ability to work, learn, and engage in activities they enjoy. By streamlining the vision care process and providing personalized solutions, OptiCheck strives to improve access to effective eye care and enhance the overall experience for customers, promoting better visual health and satisfaction.

## **2. Methodology**

To enhance our understanding of our user base and optimize our services to better meet their needs, we are conducting interviews and distributing questionnaires. Our focus is on engaging individuals from diverse age groups and genders who wear glasses. This approach enables us to gather comprehensive data and insights, ensuring that our efforts are tailored to the varied preferences and requirements of our user community.

To conduct the interviews, we selected six diverse samples in terms of age and gender, outside of eye care clinics. We posed ten questions aimed at serving our project effectively, with a focus on their experiences in the eye examination process and the selection of suitable eyewear. We also delved into the challenges they might encounter and explored potential solutions to ensure the provision of better services.

To prepare the questionnaire, we conducted an online survey that was circulated on social media platforms. We collected twenty responses for eight closed -ended questions to identify prevalent issues people face regarding vision and explore the most effective ways to save time for eyeglass wearers.

### **3. Result**

#### **• Interview result:**

We conducted interviews with individuals representing various demographics to understand their preferences and challenges in the eyeglasses industry. Participants expressed a strong inclination towards glasses over contact lenses due to comfort and style preferences. However, they encountered difficulties in selecting frames that matched their personal preferences and faced lengthy examination and purchasing processes. Common frustrations included the time-consuming nature of examinations and the wait time for receiving glasses after selection. Participants emphasized the need for industry improvements, including more stylish, sustainable, and affordable options, as well as streamlined purchasing experiences.

#### **• Questionnaire result:**

The questionnaire on eyewear habits revealed compelling insights. Many respondents wear glasses, emphasizing a prevalent reliance on vision correction. Many acknowledged the frequent need for optometrist visits, indicating a consistent concern for eye health. Reported eyesight issues varied, including nearsightedness or farsightedness, color blindness, deviation, and other complications. The comfort and security of glasses were satisfactory, yet a substantial portion faced challenges in scheduling doctor's appointments. Surprisingly, a majority found the process of obtaining a prescription tedious. Dissatisfaction with available glasses options was notable, with many expressing a rating of five or below. A striking finding was the openness to technological alternatives, with a substantial majority indicating a willingness to explore technology for their vision needs, suggesting a potential market interest in innovative solutions within the eyewear industry.

- Appendix A: Interviews

- Questions:

- Q1) Do you prefer glasses or contacts? And why?

- Q2) Imagine you wake up without finding your glasses, what would you do?

- Q3) How often do you check up with an eye doctor?

- Q4) What tests do you usually go through with your doctor?

- Q5) Have you ever done a color blindness test?

- Q6) How often do you find yourself needing to change your glasses?

- Q7) How do you prefer buying your glasses?

- Q8) What difficulties do you face choosing your glasses?

- Q9) How much time does the entire process usually take?

- Q10) In your opinion, what improvements can be made in the eyeglasses industry?

- Interviews' Transcriptions:

Interview #1:

- A1) I prefer glasses because they are more comfortable for me to wear throughout the day, and I like the way they look on my face.
- A2) If I woke up without finding my glasses, I would first try to remember where I last placed them. If I could not find them, I would rely on my memory of the layout of my surroundings to navigate until I find them or get assistance.
- A3) I usually check up with an eye doctor once a year for a routine eye exam to ensure my vision is healthy.
- A4) During my check-ups, I typically undergo tests such as visual acuity tests, eye pressure tests, and tests to check for any signs of eye diseases or abnormalities.
- A5) Yes, I have undergone a color blindness test, and the result indicated that I have a color vision deficiency.
- A6) I find myself needing to change my glasses every couple of years, depending on any changes in my prescription or if my current glasses get damaged or worn out.
- A7) I prefer buying my glasses from an optical store where I can try on different frames and get assistance from knowledgeable staff in selecting the best option for me.
- A8) The main difficulty I face when choosing glasses is finding frames that both suit my style and fit comfortably on my face without slipping or causing discomfort.
- A9) While the process of selecting frames and completing eye examinations typically takes about an hour, it is important to note that receiving the glasses themselves may require.
- A10) Improvements can be made in the eyeglasses industry by offering more customizable options for frames and lenses to better suit individual preferences and needs. Additionally, advancements in technology could lead to more innovative and comfortable designs for glasses.

Interview #2:

- A1) I prefer glasses because they give me a distinguished look and I find them more comfortable to wear throughout the day compared to contacts. Plus, I like the variety of styles available with glasses.
- A2) If I woke up without finding my glasses, I would feel a bit frustrated initially, but I would calmly search for them, retracing my steps from the night before or asking someone nearby for assistance.
- A3) I check up with an eye doctor once every two years to ensure my vision remains healthy and to address any concerns that may arise.
- A4) During my check-ups, the tests I usually undergo include assessments for myopia and deviation, as these are the primary concerns for my eyesight.
- A5) No, I have not done a color blindness test during any of my eye exams.
- A6) I find myself needing to change my glasses every few years, particularly when I notice significant changes in my prescription or when my current glasses no longer provide the clarity and comfort I need. This can vary depending on factors like my lifestyle and the quality of the glasses.
- A7) When buying glasses, I prefer to shop online where I can browse a wider selection of frames and compare prices more easily.
- A8) The main difficulty I face when choosing glasses is finding frames that not only match my personal style but also fit comfortably and complement the shape of my face.
- A9) The process of selecting and purchasing glasses usually takes me about an hour, even though booking an appointment, waiting, and undergoing tests can be time-consuming.
- A10) From my perspective, the eyeglasses industry could see advancements by integrating sustainable materials into their production processes, thereby contributing positively to the environment. Furthermore, enhancing accessibility to eye care services, especially in underserved areas, would ensure more people have access to quality vision.

Interview #3:

- A1) I wear both glasses and contact lenses, but I cannot give up glasses because they are more comfortable and suitable for me, especially since I suffer from dry eyes.
- A2) As I mentioned earlier, I wear my contact lenses, but I do not think I can endure the entire day without glasses. I will try to find them or cancel all my plans for the day and stay at home if I cannot locate them.
- A3) I have my eyes checked by the doctor every six months to ensure the level of my vision and to make sure that my glasses still meet my needs. Sometimes, I may procrastinate and go only once a year, but I do not recommend that.
- A4) During my visits to the doctor, I undergo a comprehensive eye examination that includes checking my vision and alignment. However, I make sure to inform the doctor to review the dryness level in my eyes. I ask for a clear prescription for both glasses and contact lenses.
- A5) I have not undergone any examination that includes color blindness, but I would like to do so. However, I do not know where I can get this examination done in a nearby place and at a reasonable cost.
- A6) I need to change my glasses every four to six months because the prescription constantly changes, and accidents like the glasses falling or getting scratched can occur.
- A7) It is better for me to order the eyeglass frame from one of the online websites because they offer a wider range of options compared to physical stores. Upon receiving the frame, I can have the eyeglass lenses adjusted at a local store.
- A8) When ordering from online stores, the frame may arrive differently than expected. On the other hand, if I go to a physical store, I might not find the suitable shape.
- A9) The examination may take from an hour to an hour and a quarter, while the arrival of the frame typically takes about a week in ideal cases. I dislike undergoing the examination and ordering glasses as I find it tedious and bothersome.
- A10) I hope for a method that shortens the eye examination process and provides a more extensive variety when choosing eyeglass frames

Interview #4:

- A1) Contact lenses may be the better option for me, as they can be more suitable for general occasions and often complement your appearance better than glasses.
- A2) Search for them, and if I cannot find them, I will sit in the front seat and inform everyone that I did not wear my glasses today and need assistance with some matters.
- A3) I attempt to have the examination once a year, aiming for every six months, as I want to ensure the stability of my vision.
- A4) I want to undergo an eye examination for assessing nearsightedness, farsightedness, and astigmatism. Additionally, I am interested in getting an examination related to laser eye surgery. However, I am unsure where I can obtain this type of testing.
- A5) I have not done that, and I do not think I need it either because, according to my information, it does not affect women, and the incidence rate is extremely low.
- A6) Every year, under normal circumstances, I undergo a re-examination. Also, if the glasses break or get scratched.
- A7) I find that purchasing from physical stores is the better option, as it allows me to try on the glasses and see their materials more effectively than online websites. Additionally, I believe diversifying my purchases, whether in terms of color or shape, is beneficial. Therefore, I enjoy re-purchasing each time to obtain new and varied eyeglasses.
- A8) I acknowledge the challenges related to unaffordable prices and the difficulty of trying on glasses effectively in stores, especially while wearing a Hijab. This can make it challenging to find glasses that fit me perfectly and complement my appearance well.
- A9) I do not complete the entire process on the same day, as the eye clinic does not have a section for purchasing glasses. The examination process typically takes half an hour and choosing the glasses takes me about an hour. After making my selection, I receive the glasses within two days.
- A10) I wish they could provide a feature that facilitates both the examination and the receipt of glasses at the same time without the need to go to multiple locations.

Interview #5:

A1) I prefer glasses because they provide comfort and ease of use, and they do not require daily preparation like contact lenses.

A2) I would try to search for my glasses in the usual place where they are usually kept, and if could not find them, I would use contact lenses temporarily, even though they are uncomfortable and challenging to use.

A3) I try to visit the doctor regularly once a year or when I experience any new vision problems.

A4) During the eye examination, a vision test is conducted to determine the required visual correction, and the health of the eyes is also examined to detect any potential issues.

A5) No, I have never taken a color blindness test.

A6) I need to change my glasses frequently due to the difficulty of finding the perfect glasses for my face from the beginning.

A7) I prefer to purchase my glasses from a specialized local store where they have a wide range of high-quality glasses, and I can try them on before buying.

A8) The main difficulty lies in choosing the shape and design that suits my face and matches my personal taste.

A9) That depends on several factors, including the appointment schedule, availability of the desired frames and lenses. It takes a few days to two weeks to get the new glasses after selecting the frame, manufacturing the lenses, and preparing the glasses.

A10) Several improvements can be made in the eyewear industry, such as enhancing frame designs to be more stylish and suitable for different face shapes.

Additionally, modern technologies like virtual reality and augmented reality can be applied to improve the glasses selection experience and better fit individual needs.

Interview #6:

- A1) I consider glasses to be the best option for me because they provide an easy and quick solution to improve my vision and give me a distinctive appearance. They also do not require direct contact with the eye, which reduces the risk of infection.
- A2) I would be in a state of chaos and disruption because the process of replacing glasses usually involves booking appointments and long waiting times.
- A3) Usually, I visit the eye doctor at least twice a year for early detection of any health problems and to maintain eye health. However, these visits can be exhausting and take a long time out of my daily schedule.
- A4) When I visit the eye doctor, tests are conducted to measure visual acuity and determine distant and near vision. Eye muscle strength is also examined, along with tests for visual deviations.
- A5) Yes, I have undergone a color blindness test, and it was revealed that I have some difficulty distinguishing certain colors such as red and green.
- A6) I change my glasses when I notice a change in the condition of my eyes after an examination, or when they are damaged or lost.
- A7) I prefer online shopping to buy my glasses because it is easier to browse and allows me to see customer reviews about the product. They are also conveniently delivered to my location.
- A8) Some difficulties I face when choosing glasses include selecting the right frame for my face shape and ensuring that they fit comfortably, in addition to choosing lenses that are suitable for my specific visual needs. Price can also be a challenging factor to consider, as I need to find a balance between quality and my available budget.
- A9) The examination process is usually quick, but purchasing and receiving the glasses takes around a week to 10 days (about one and a half weeks).
- A10) There are several improvements that can be made in the eyewear industry, such as offering multiple color and style options, using lightweight materials to make them more comfortable for extended wear, and developing special coatings for lenses to protect them from scratches.

**Interview #7:**

- A1) Glasses; they are much more convenient because you can easily wear them as soon as you wake up.
- A2) I would immediately have to get new ones; I cannot survive without mine.
- A3) Usually every 3 to 6 months, depends on if I am having issues or not.
- A4) Routine tests include the eye chart for visual acuity, tonometry to measure intraocular pressure, and subjective refraction for prescription adjustments.
- A5) No, I cannot seem to find one honestly.
- A6) My glasses usually last a year, but it depends on the quality and if I happen to break them or not.
- A7) I usually like trying them on, but options are extremely limited in stores, so I usually buy them online.
- A8) Finding the right glasses for my face shape is exceedingly difficult and when I do, I usually do not find the right frame and color I like.
- A9) Booking an appointment then going to the doctor and finding the glasses I like takes a week at least.
- A10) The entire process of getting a prescription should be easier since it is a necessity and glasses should be made more accessible at a better price.

**Interview #8:**

- A1) I prefer glasses due to their convenience. Managing contacts seems an unnecessary burden.
- A2) In such a scenario, I would carefully search for them to avoid any disruption to my daily routine.
- A4) I adhere to an annual checkup routine to ensure the accuracy of my prescription.
- A5) Routine assessments include the eye chart, tonometry, and subjective clarity tests.
- A6) Changes are prompted by alterations in my prescription or the loss of my current pair.
- A7) While online shopping is a convenient option, I would welcome advancements like instant prescriptions and a virtual try-on experience.
- A8) Choosing glasses is challenging due to the abundance of options and uncertainty regarding their appearance on my face.
- A9) The entire eyewear selection process, from examination to frame selection, typically consumes a considerable amount of time.
- A10) Advancements such as instant prescriptions and enhanced virtual try-on technology would significantly improve the eyeglasses selection process.

## **Appendix B: Questionnaire**

### **. Questions:**

Q1: Do you wear glasses?

Q2: Do you frequently find the need to visit an optometrist?

Q3: Is it easy for you to schedule doctor appointments?

Q4: Do you find the process of getting a prescription tedious?

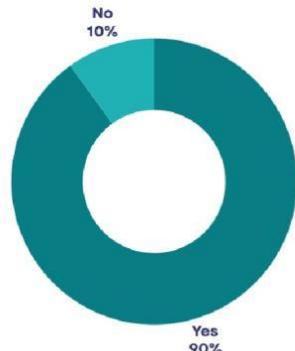
Q5: What issues are you experiencing with your eyesight?

Q6: Are your glasses comfortable and secure for you?

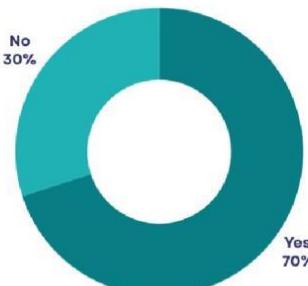
Q7: How satisfied are you with the available when choosing glasses?

Q8: If there was technology available as an alternative to visiting a doctor, would you choose to use it?

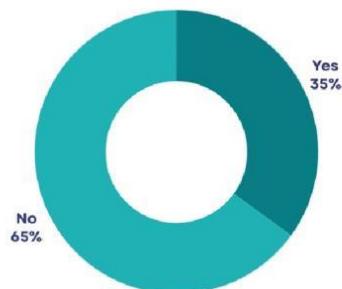
 Do you wear glasses?



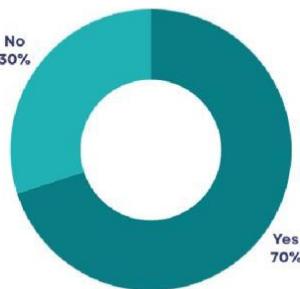
 Do you frequently find the need to visit an optometrist?



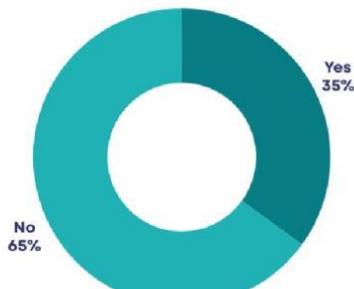
 Is it easy for you to schedule doctor appointments ?



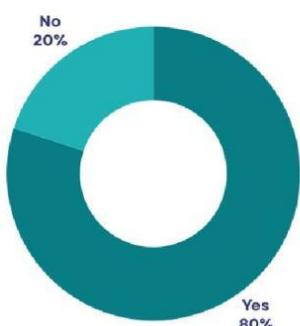
 Do you find the process of getting a prescription tedious?



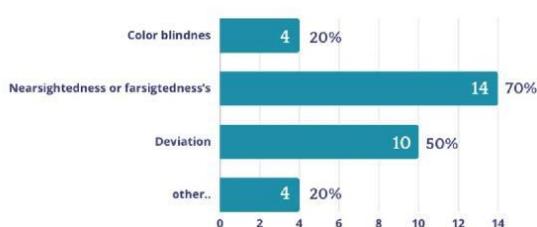
 Are your glasses comfortable and secure for you?



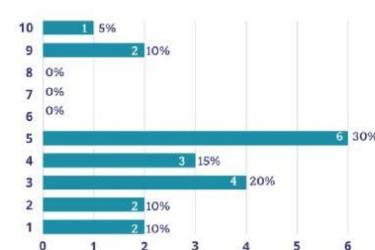
 If there was technology available as an alternative to visiting a doctor, would you choose to use it?



 What issues are you experiencing with your eyesight?



 How satisfied are you with the available option when choosing glasses?



#### **4. Problem Definition:**

The project aims to facilitate the lives of busy individuals who lack the time to schedule, and wait for appointments. It allows them to undergo various eye tests, such as deviation and color blindness, without the need for multiple appointment bookings. Additionally, users can choose suitable eyeglasses using a smart camera that captures facial measurements, assisting those facing difficulty finding options tailored to their limited needs.

Furthermore, the project offers the feature of receiving the chosen eyeglasses instantly, To facilitate their eye examination process without the need to visit the doctor and make appointments.

#### **5. Personas:**

We identified our personas based on information we gathered from interviews and the questionnaire. The first persona is "Sara Ahmad", a 35-year-old marketing manager based in Riyadh, values convenience, and efficiency in her daily routines. Balancing a demanding work schedule with family time and personal interests, she seeks streamlined solutions for her vision care needs. Optimal vision is essential for both her professional performance and personal well-being. However, time constraints and limited options in traditional eyeglass processes present challenges for Sara. She is motivated to find a convenient and accurate solution that minimizes disruptions to her busy schedule, ensuring she can continue to excel in her professional endeavors while enjoying quality time with her loved ones. We defined "Sara" based on [Interview 3 answer (8,9)], [Interview 5 answer (2)], [Interview 8 answer (10)], and the questionnaire results.

The second persona we deal with Mr. Mohammed, a man in his late sixties, who has retired from work and suffers from color blindness. Mr. Mohammed finds it extremely challenging to perform his daily tasks and considers himself reliant on his family in many aspects of his life. Therefore, Mr. Mohammed seeks to find a solution that helps him choose the appropriate glasses for his color blindness issue without becoming a burden on his family. We defined " Mohammed " based on [Interview 1 answer (3,5,10)], [Interview 3 answer (6)], [Interview 5 answer (8)], and the questionnaire results.



## Sara

Age: 35

Location: Riyadh

Occupation: Marketing Manager

*"You know, it's really tough to keep up with everything sometimes. Between work, taking care of my family, and managing household chores, finding time for personal appointments can be a real struggle. Vision care is important, but it's just one more thing to add to my never-ending to-do list. I wish there was a more convenient way to take care of my vision without all the hassle."*

### DESCRIPTION

Sara is a passionate and creative marketing manager who enjoys drawing and design as a personal hobby. In addition to her demanding work, she spends her leisure time reading and engaging in physical activities that help her relax and rejuvenate.

### GOALS AND NEEDS

- Convenient Access: Access vision care without traditional optometrist appointments.
- Time-Saving Process: Minimize time and effort in selecting and purchasing eyeglasses.
- Accurate and Personalized: Ensure precise vision assessment and tailored eyeglass recommendations.

### EVERYDAY ACTIVITIES

- Work Responsibilities: Managing marketing campaigns, attending meetings, and handling client communications.
- Family Time: Spending quality time with her spouse and children.
- Personal Errands and Self-care: Running errands, taking care of household tasks, and prioritizing self-care activities.

### MOTIVATION

- Health and Well-being: Clear vision is vital for Sara's daily activities and overall quality of life.
- Professional Performance: Optimal vision supports Sara's effectiveness in her role as a marketing manager.
- Time Management and Convenience: Sara prioritizes efficient solutions that minimize disruptions to her busy schedule.

### CHALLENGES

- Time Constraints: Difficulty scheduling optometrist appointments due to her busy schedule.
- Inconvenience: Finding the traditional eyeglass process disruptive and inefficient.
- Limited Options: Feeling constrained by the limited vision care options available.



## Mohammed

Age: 67

Location: Riyadh

Occupation: Retired

*"Family is the masterpiece of life's canvas, where every color, though different, blends into a beautiful portrait of love and togetherness."*

### DESCRIPTION

Mohammed is a beloved father and grandfather who recently retired after working in a consulting firm for 30 years. He enjoys family time and taking has hobbies including jogging.

### EVERYDAY ACTIVIES

- Breakfast with his whole family.
- Going for a walk around the neighborhood .
- Going to doctor's appointments.
- Light reading.

### MOTIVATION

- To create long lasting memories with his family.
- To watch his grandkids grow up.
- To live a healthier lifestyle
- To paint a portrait to fill his time.

### GOALS AND NEEDS

- To spend more with his grandkids
- To learn how to paint.
- To excercise without too much struggle.
- To not depend on his family too much as he ages.

### CHALLENGES

- He feels dependent on his family doing everyday tasks.
- He has issues distinguishing certain colors.
- Finding suitable glasses for his eyesight deficiencies.

## 6. user stories:

as user	Details	Priority
I want the perfect glasses for my face.	On the homepage, the user clicks the 'Find Your Perfect Glasses' button, then selects 'Scan Your Face.' After taking a photo of their face and waiting for a few seconds, a collection of suggested glasses will appear. The user chooses from these options and proceeds to complete the payment by clicking either 'Cash' or 'Credit Card.'	High
I want to take a color blindness test.	From the homepage, the user will click on the 'Test Your Vision' button, choose the color blindness test, and undergo the test by entering the numbers visible in the images. Upon completing the test, the results will be displayed for the user.	Medium
I want a quick solution to get glasses	From the homepage, the user selects 'Find Your Perfect Glasses,' then 'choose from verity', views a diverse selection of glasses, adds them to the cart, clicks 'Buy Now,' chooses a payment method 'cash' or 'card', and receives the selected glasses.	High
I want to check my vision health and update my lenses.	On the homepage, the user clicks the 'Test Your Vision' button, selects the visual activity, and undergoes the test by clicking the arrows to determine the direction of the letter 'E.' After completing the test, the results will be displayed for the user.	Medium
I want a deviation test.	On the homepage, the user clicks the 'Test Your Vision' button, chooses the deviation, and undergoes the test by clicking the direction of the aperture in the circle. After completing the test, the results will be displayed for the user.	Medium
I want a detailed summary of my eye exam results.	From the homepage, the user clicks on the 'Previous Test Results' button. A list of conducted tests will appear, allowing the user to choose. Then print the selected test results by clicking the 'Print' button or send them via email by clicking the 'Email' button.	Low

## 7. Sketches:

**1. Home Screen**

**2. Get Started Screen**

**3. Log In Screen**

**4. Sign Up Screen**

**5. Verify Screen**

**6. Forget Password Screen**

**7. Verify Phone Number Screen**

**8. Onboarding Screens (1/3, 2/3, 3/3)**

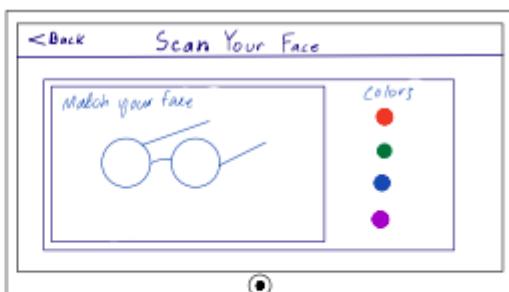
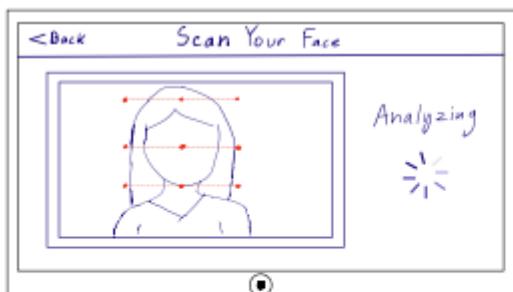
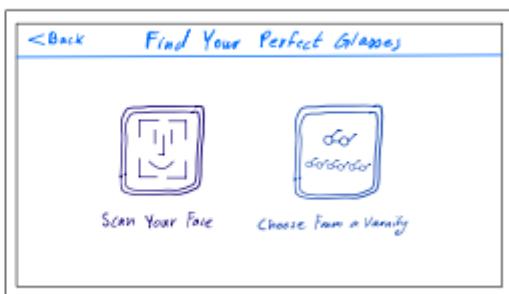
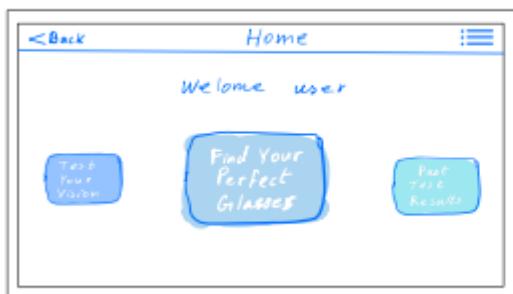
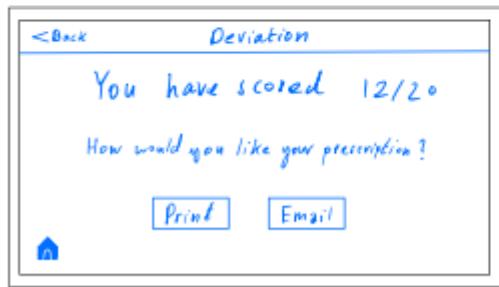
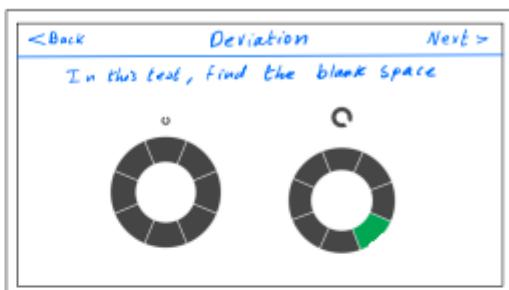
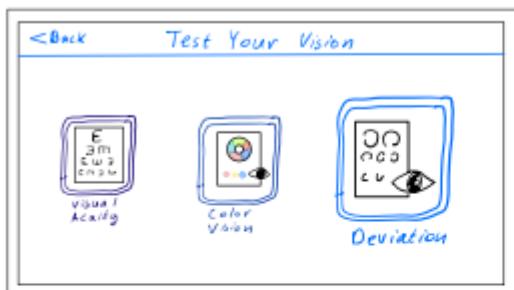
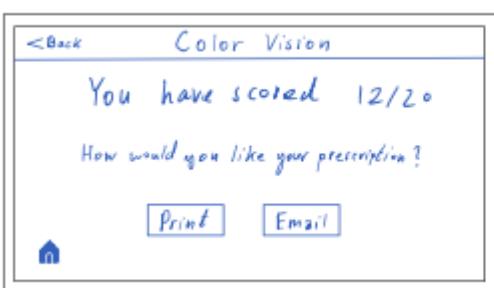
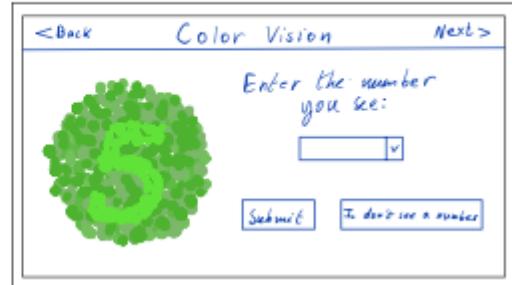
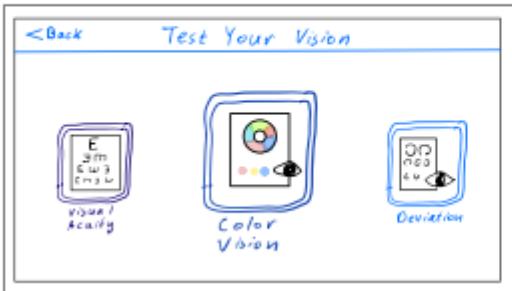
**9. Home Screen (Initial View)**

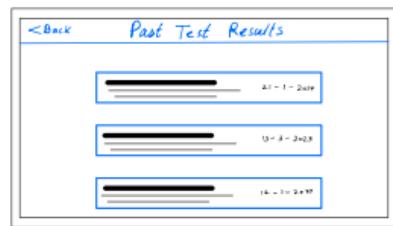
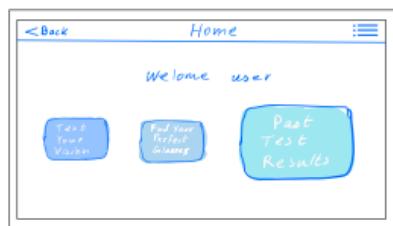
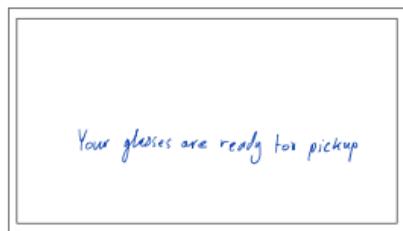
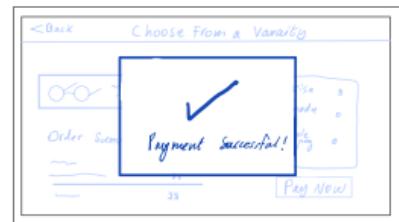
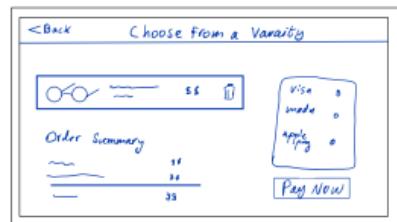
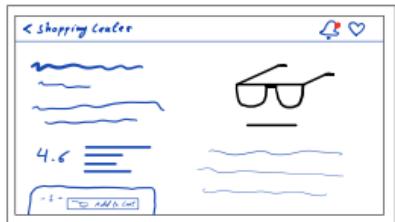
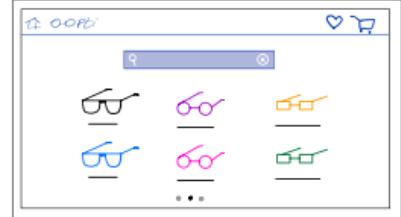
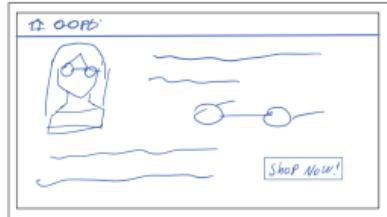
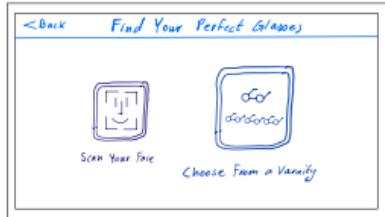
**10. Home Screen (With Side Navigation)**

**11. Test Your Vision Screen**

**12. Visual Acuity Screen**

**13. Visual Acuity Score Screen**





## 8. story boards:

Story board 1:



1. Ms. Lee shares her vision concerns with Sarah, expressing her frustration with blurry vision, long visits to the eye doctor, extended wait times for glasses, and struggles finding glasses that fit her face.



2. Sarah suggests OptiCheck as a potential solution to Ms. Lee's vision problems.



3. Intrigued by Sarah's suggestion, Ms. Lee decides to explore OptiCheck as an alternative to traditional eye doctor appointments.



4. Ms. Lee approaches the OptiCheck kiosk, noting its modern design and user-friendly interface.

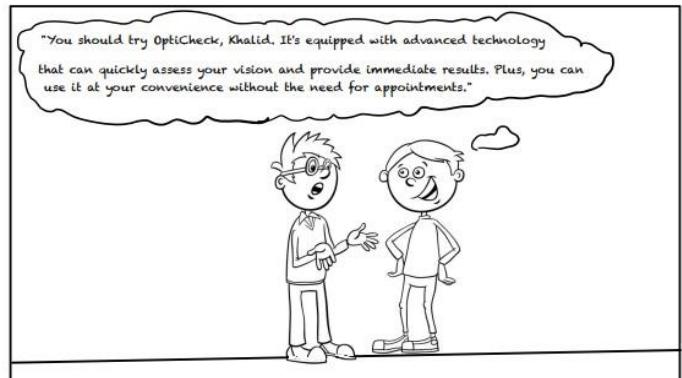


5. Ms. Lee interacts with OptiCheck, using its smart camera feature to assess her vision and find glasses that suit her face shape.

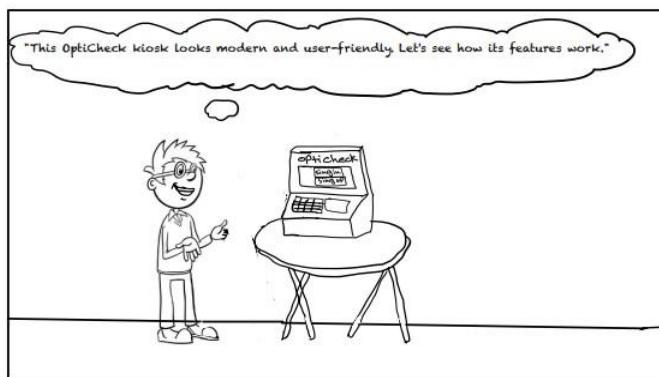


6. Ms. Lee chooses her favorite eyewear options using the intuitive OptiCheck interface. She is impressed by its convenience and ease of use. Selecting the glasses quickly, she proceeds to make an easy payment within a few minutes. As she completes the payment, the glasses drop into the designated slot, ready for her to pick up. Sarah watches in amazement as the process unfolds smoothly.

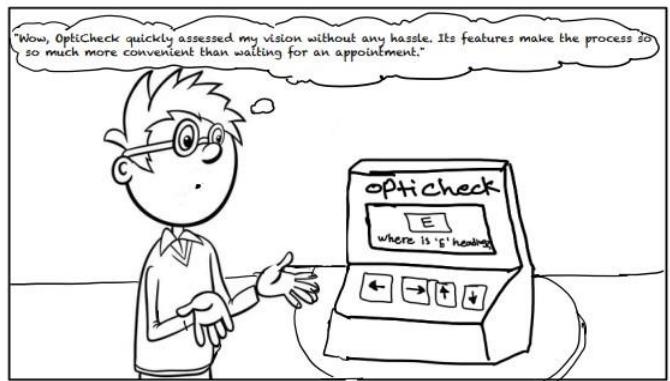
## Story board 2:



1. Khalid, visibly frustrated, shares his ongoing struggle with blurry vision and the inconvenience of scheduling optometry appointments.

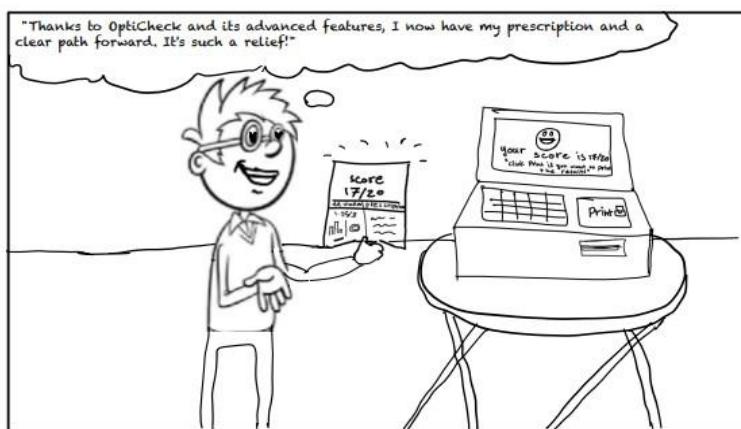


2. Mohamed listens attentively to Khalid's concerns and offers a solution.



3. Khalid approaches the OptiCheck kiosk, examining its modern and user-friendly design.

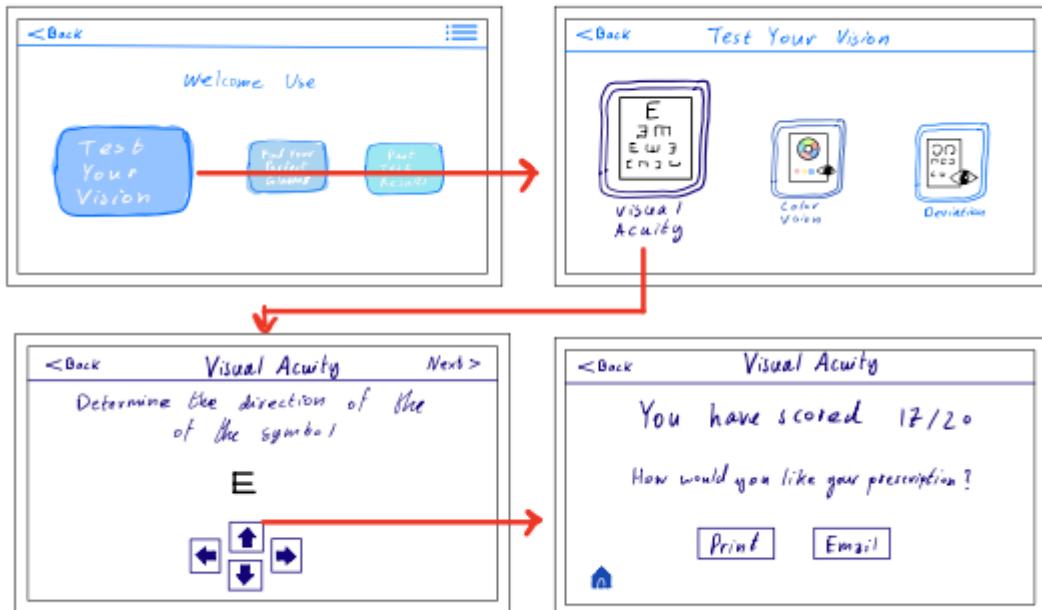
4. Khalid interacts with OptiCheck, experiencing its efficient and hassle-free vision assessment process.



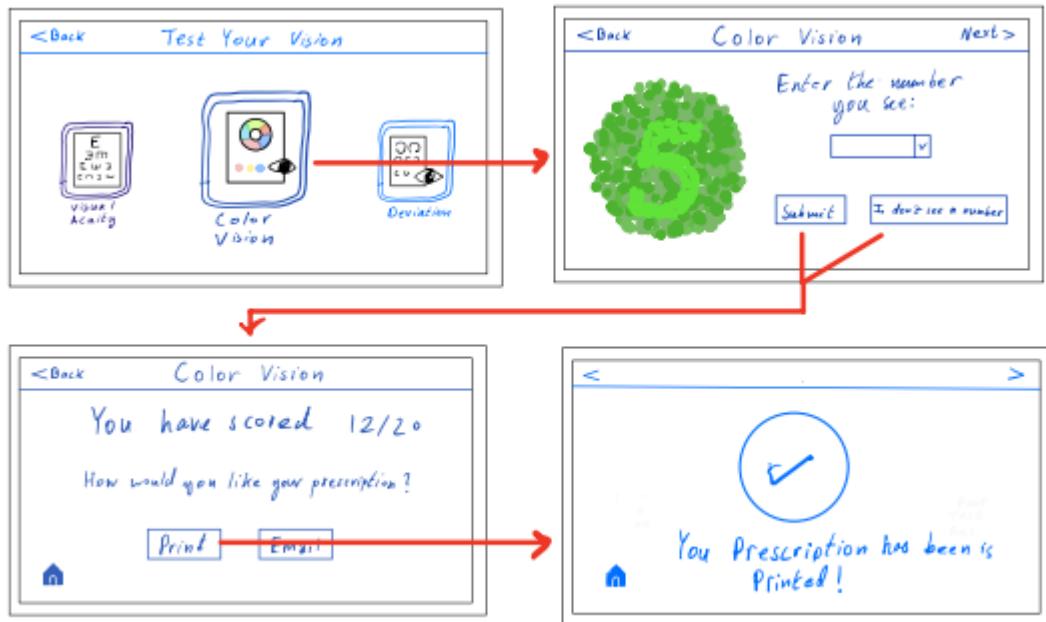
5. Khalid receives his prescription from OptiCheck, feeling relieved and grateful for the efficient service it provided.

## 9.user flow:

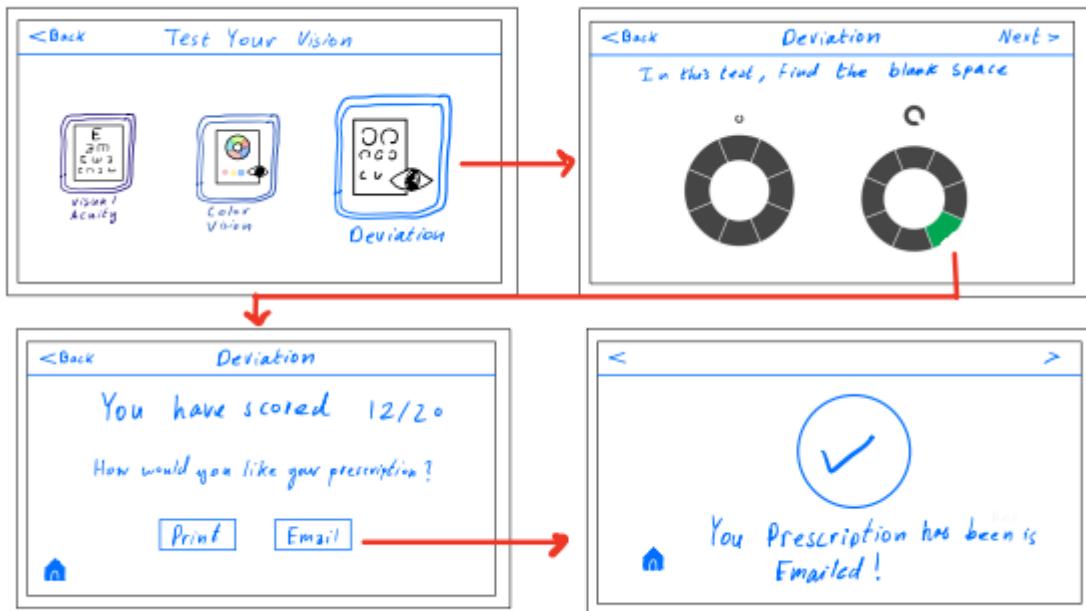
1.I want to check my vision health and update my lenses.



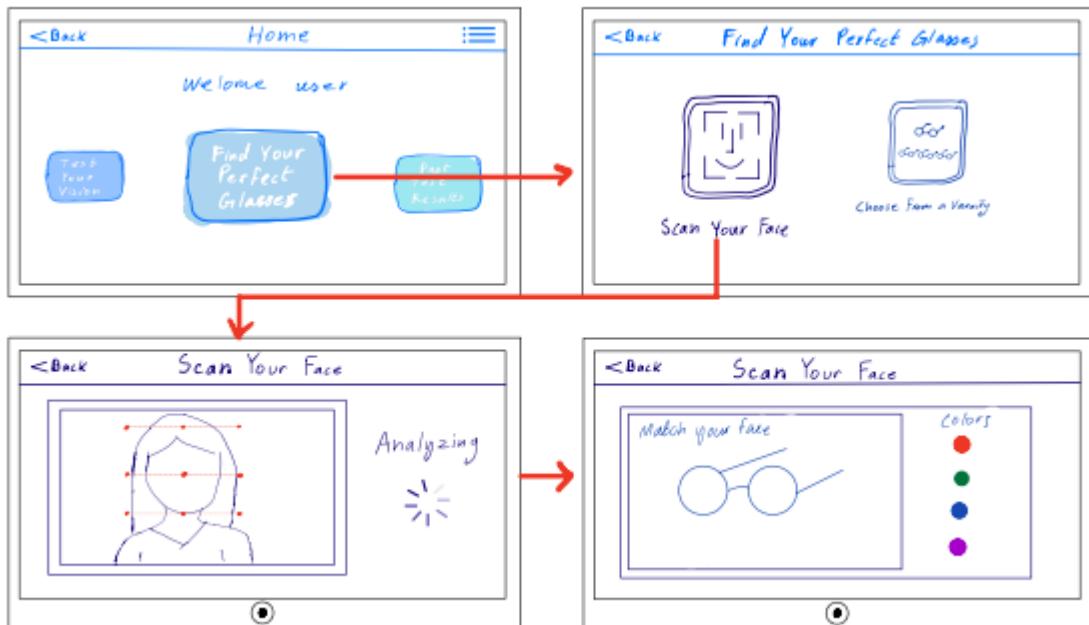
2. I want to take a color blindness test.



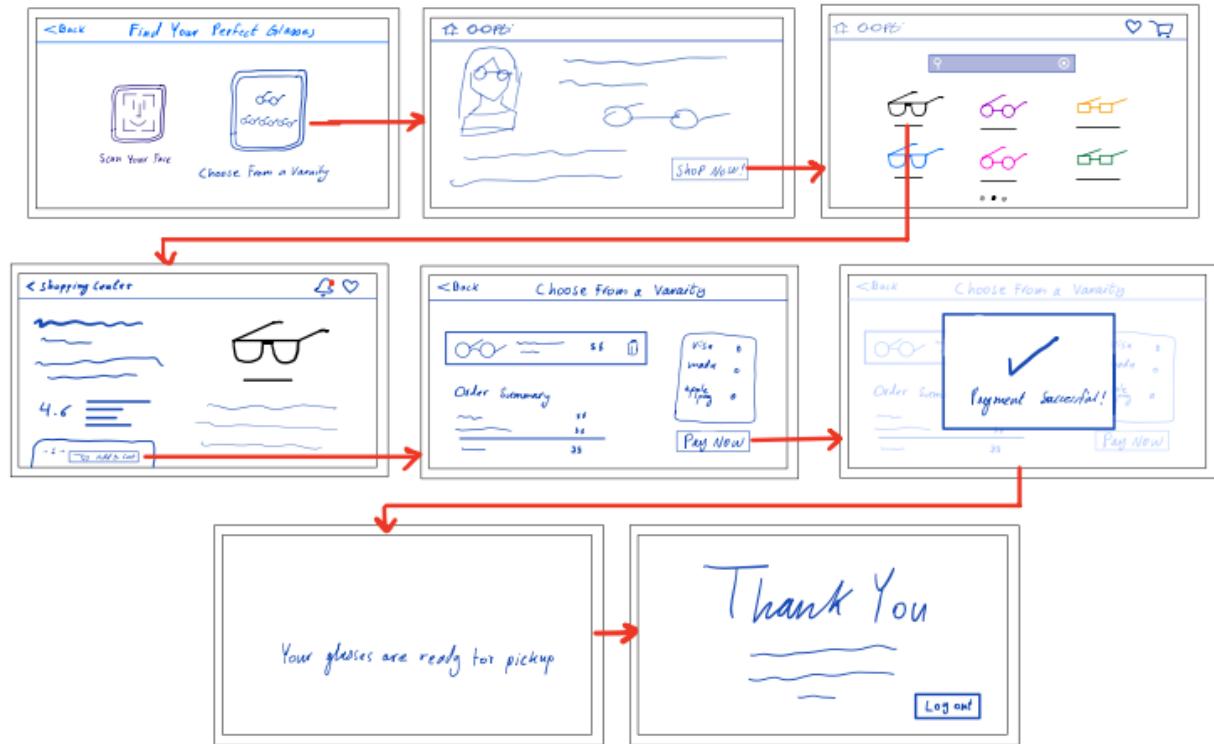
3.I want a deviation test.



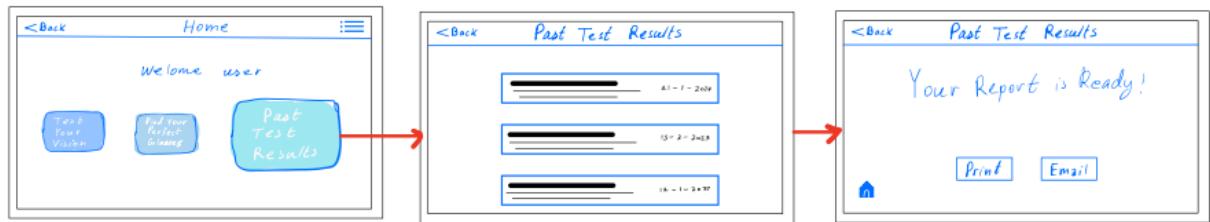
4.I want the perfect glasses for my face.



5.I want a quick solution to get glasses.



6.I want a detailed summary of my eye exam results.



## 10. design rules:

### Learnability Principles

	<b>Principle</b>	<b>Sketch No/ User Flow No</b>	<b>Describe how you applied this principle</b>
1 2	<b>Predictability</b>	Sketch #12	Users can predict that pressing “menu icon” will display a menu of options, Such as settings and language.
		Sketch #20&19	The user can predict that pressing the “home icon” is used to return to home page.
3	<b>Synthesizability</b>	Flow#6(sketch#2&3)	The page appears to the user, allowing them to perform both printing and receiving emails. However, they are unable to receive the results in a text message.
4	<b>Familiarity</b>	Flow#5(sketch#6)	The system notifies the user that the payment process has been completed successfully.
5	<b>Generalizability</b>	Sketch#31	magnifying glass, shopping cart icons are familiar to the user.
6	<b>Consistency</b>	Sketch #4&3 Sketch#12 Sketch #19&16&12&11	Sign up and Sign in page is like most apps. Menu page and icon is similar to most apps. Menu page and icon appears in most pages.

## Flexibility Principles

	<b>Principle</b>	<b>Sketch No/ User Flow No</b>	<b>Describe how you applied this principle</b>
7	<b>Dialog initiative</b>	User flow#5(sketch#1) & user flow#4(sketch#2)	The user will not be able to continue using the app until he chooses one of the two options.
8	<b>Multi-threading (<i>if applicable</i>)</b>	User flow#4(sketch#4)	The user can browse through the suggested glasses and change their colors simultaneously.
9	<b>Task migratability (<i>if applicable</i>)</b>	Sketch#3&12	Upon logging in, the system will automatically retrieve the user's information without the need for re-entering it.
10	<b>Substitutivity</b>	User flow#3(sketch#3&4)	There are several ways for the user to receive their test results, either via email or by printing them out.
11	<b>Customizability</b>	Sketch#12	The user can customize the preferred language and can change the screen mood from light to dark and vice versa.

## Robustness Principles

Rule#	Principle	Sketch No/ User Flow No	Describe how you applied this principle
12 13	<b>Observability</b>	Browsability	Sketch#38  The user can track their status in their previous examinations.
14 15		Defaults	Sketch#3  When the user logs in, the settings are automatically configured.
		Reachability	Sketch#13&more  Users can navigate easily using the side bar menu or by using the arrows.
		Persistence	User flow#5(sketch#3)  When adding an item to the shopping cart, a notification will appear on the icon indicating that the purchase process is pending
16	<b>Recoverability</b>	User flow#1(sketch#1&2&3)	The user can return to the previous page if they select the wrong test without the need to undergo it.
17	<b>Responsiveness</b>	User flow#4(sketch 3&4)	When capturing a photo, a download icon will appear until the analysis of facial features is complete, and the suggestions are displayed.
18	<b>Task Conformance</b>	Sketch#11&26	The user can perform various tasks, such as undergoing multiple vision tests, purchasing glasses, and obtaining a prescription.

## 11. prototype:

The features provided by "opti Check" include:

**Account Registration and Information Storage:** Users can create an account and store their personal and medical information.

**Login and Information Retrieval:** Users can log in subsequently and access the information they have stored.

**Conducting Visual Tests:** Users can undergo several visual tests such as distance and near vision tests, deviation tests, and color blindness tests.

**Monitoring Test Results:** There should be a system to monitor the results of each test conducted by the user, and they should be able to access these results at any time. Users are allowed to extract these tests via email or printing.

**Purchase of Glasses:** The platform should provide the option to purchase glasses online, with the choice between direct purchase from the store or using smart camera feature to identify the suitable glasses.

**Multiple Payment Methods:** Secure payment options like Visa and Mastercard should be provided to complete purchases.

**Glasses Delivery:** After payment, the glasses should be prepared for delivery directly from the device.



To build the model, we needed five black cardboard pieces. We glued them together using adhesive tape to form a box-like structure. Then, we cut out a space or slot for the main device, "opti Check," and another opening for the payment area, as well as a space for the insertion and retrieval of the non-prescription glasses.



## Step 1: Participants

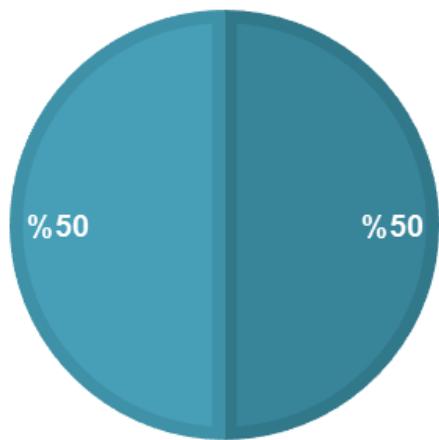
### Participant Profiles

Our participant group for OptiCheck usability testing represented a diverse mix of individuals. Spanning ages from 20 to 55, with an equal split between genders, each participant brought a unique perspective to the evaluation process. Among them were professionals like Aljoharah and Fajer, both seasoned experts in their fields, eager to explore the potential of new technologies. Joining them were college students Mohammed and Khalid, intrigued by innovative solutions, along with Haya and Salah, high school students curious about emerging technologies. Rounding out the group was Rachel, a homemaker balancing family life with a passion for technology. While Aljoharah and Fajer had some exposure to similar products, Mohammed, Khalid, Haya, and Salah were encountering this type of device for the first time. Nevertheless, all participants demonstrated a high level of familiarity with mobile interfaces, ensuring a comprehensive assessment of OptiCheck's usability and user experience across various age groups and backgrounds.

<i>Participant name</i>	<i>Age</i>	<i>Gender</i>	<i>Experience with similar products (1-5)</i>	<i>Use of mobile/website interface (1-5)</i>
1 Aljoharah	25	Female	3	4
2 Fajer	30	Female	4	5
3 Mohamad	20	Male	1	3
4 Khalid	22	Male	2	4
5 Haya	18	Female	1	4
6 Salah	17	Male	1	3

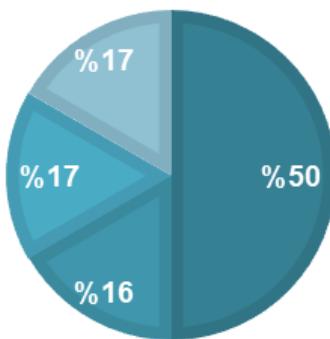
### PARTICIPANT GENDER

■ Female ■ Male



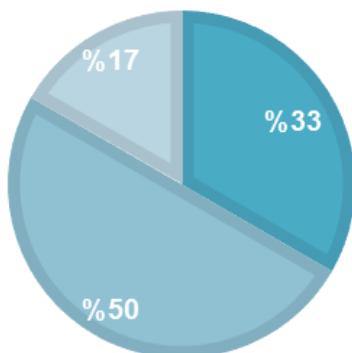
### EXPERIENCE WITH SIMILAR PRODUCTS (1-5)

■ 1 ■ 2 ■ 3 ■ 4 ■ 5



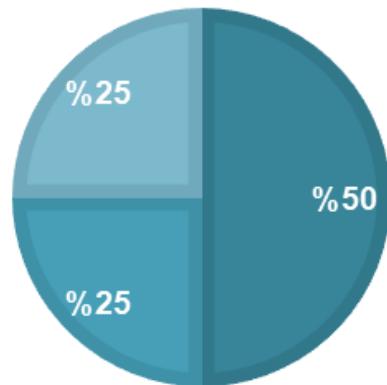
### USE OF MOBILE/WEBSITE INTERFACE (1-5)

■ 1 ■ 2 ■ 3 ■ 4 ■ 5



### PARTICIPANT AGE

■ 20-15 ■ 25-21 ■ 30-26 ■



## **Step 2: Procedure**

### ***Outline of the procedure***

After wrapping up the design phase of the OptiCheck application, we randomly selected six participants from our research pool for the usability test. We diligently prepared all necessary materials, including consent forms, questionnaires, scenarios, and tasks tailored specifically for the OptiCheck usability evaluation. We scheduled one-on-one sessions with each participant at their preferred time and date. At the beginning of each session, we warmly welcomed our participants and ensured their comfort by providing consent forms for video and audio recording. Before diving into the facilitator script, we encouraged participants to think aloud during task execution, allowing us to gain insights into their thought processes. Then, we presented them with a scenario, envisioning themselves at a pharmacy utilizing OptiCheck for eye tests and eyewear selection, followed by the five predetermined tasks. Throughout the session, we closely observed participants' interactions with the OptiCheck interface, noting any challenges encountered. Upon task completion, we administered questionnaires and conducted interviews to gather comprehensive feedback on their experience. We expressed our gratitude for their invaluable contribution and reiterated the significance of their input in refining the OptiCheck application for optimal user experience.

### ***Timeline***

We tested 5 different tasks in OptiCheck to measure the clarity of the interface's visual design, readability and ease of navigation.

<b>Participant name</b>	<b>Day</b>	<b>Date</b>	<b>Start session time</b>	<b>Finish session time</b>	<b>Duration of session</b>
1 Aljoharah	Monday	April 2	10:00 AM	10:20 AM	20 minutes
2 Fajer	Tuesday	April 3	11:30 AM	11:45 AM	15 minutes
3 Mohamad	Wednesday	April 4	09:15 AM	09:24 AM	9 minutes
4 Khalid	Thursday	April 5	02:00 PM	02:18 PM	18 minutes
5 Haya	Friday	April 6	03:45 PM	04:05 PM	20 minutes
6 Salah	Saturday	April 7	11:20 AM	11:29 AM	9 minutes

## Tasks

We tested 5 different tasks in OptiCheck to measure the clarity of the interface's visual design, readability and ease of navigation.

Task #	Task (as it was presented to users)	Objective of the task (What was this task designed for measuring?)
1	Create a new user account	Measure the ease of the account creation process and the overall registration experience
2	Perform visual acuity test	Evaluate the user's ability to accurately complete a visual acuity test
3	Perform color vision test	Measure the user's color vision and their ability to accurately identify colors
4	Payment	Measure the effectiveness of the payment process for purchasing glasses
5	Use smart camera to select perfect glasses	Measure the effectiveness of the smart camera technology in assisting users with eyewear selection

## Performance Measures and Feedback

The metrics we used to measure the performance is effectiveness, efficiency, and satisfaction. We measured the effectiveness by counting the number of tasks completed successfully and the number of errors per task. We also measured the efficiency by calculating the time to finish the task, and then calculate the average. To measure the satisfaction, we made a survey to take the participants feedback about the tasks.

Metric	How was it measured?	How was the data created/captured?
Effectiveness	Task success	By observing the participants during the sessions and count the number of tasks completed successfully.
	Number of Errors	By observing the participant during the sessions and count the number of errors per task.
Efficiency	Time on Task	By using timer during sessions to measure the time needed by the participant to finish the task, and then we calculated the average.
Satisfaction	User surveys	By making Google forms surveys and share it with the participant to fill it when they finished the tasks, then we calculated the satisfaction rate based on the answers.

### Step 3: Usability Results and Discussion

#### Results:

##### 1. Task Completion Success Rate and Time on Task

All participants successfully completed Task 1 (Create a new user account). All participants successfully completed Task 2 (Perform visual acuity test), despite encountering four non-critical errors. Two-thirds of the participants (66.66%) were able to complete Task 3 (Perform color vision test), while rest experienced critical errors preventing them from completing the task. Half of the participants (50%) were able to complete Task 4 (Payment) due to 3 of the participants experiencing critical errors. All participants successfully completed Task 5 (Use smart camera to select perfect glasses).

Task 3 required participants to find a number hidden in similarly colored dots and took the longest time to complete (avg = 319.25 seconds). However, completion times for all completed tasks ranged from 74 seconds (approximately 1 minute) to 319 seconds (more than 5 minutes)

Participant	Task 1		Task 2		Task 3		Task 4		Task 5	
	complet e task	Tim e on Ta sk	complet e task	Tim e on Ta sk	complet e task	Tim e on Ta sk	complet e task	Tim e on Ta sk	complet e task	Tim e on Ta sk
P1	✓	140s	✓	300s	✓	560s	✓	140s	✓	60s
P2	✓	154s	✓	202s	✓	367s	✓	120s	✓	118s
P3	✓	226s	✓	264s	-	-	✓	188s	✓	182s
P4	✓	283s	✓	389s	-	-	-	-	✓	408s
P5	✓	390s	✓	300s	✓	250s	-	-	✓	260s
P6	✓	150s	✓	200s	✓	100s	-	-	✓	90s
Completi on Rates	6/6 100%		6/6 100%		4/6 66.66%		3/6 50%		6/6 100%	
AVG . Time on Task		223.8s		275.8s		319.25s		74.6s		183.3s

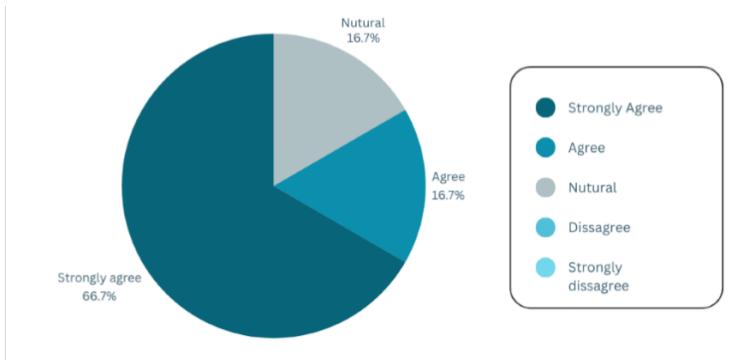
## 2. Errors

Task 4 had the most errors, with 5 errors. These errors included participants not being able to find the "Add to cart" button to complete the purchase (critical) and adding multiple pairs of glasses to the cart without buying (non-critical). Task 1 did not have any reported errors, indicating that participants completed the task without encountering any issues. Task 2 had 4 errors, all of which were non-critical. Task 3 had 2 errors, which were critical. Task 5 had no reported errors, suggesting that participants completed the task successfully without encountering any issues.

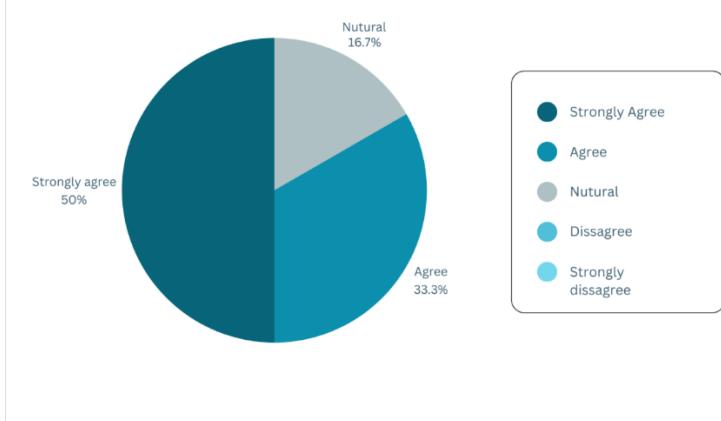
Tasks	Number of errors	Errors description	Critical or non-critical (C,NC)
Task 1	0		
Task 2	4	Clicking randomly without observing the symbol properly	NC
		Misinterpreting the symbol due to not taking enough time to analyze	NC
Task 3	2	Misunderstanding the task and entering the color of the number displayed instead of the actual number.	NC
Task 4	5	Not being able to find the "Add to cart" button to complete the purchase.	C
		Adding multiple pairs of glasses to the cart without the intention of buying.	NC
Task 5	0		

### 3.3. Satisfaction questionnaire

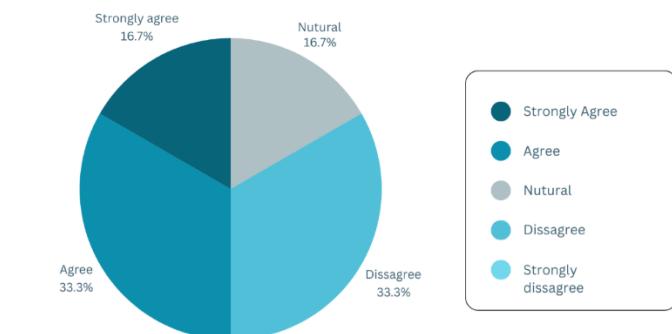
Q1: How satisfied were you overall with your experience with the OptiCheck application?



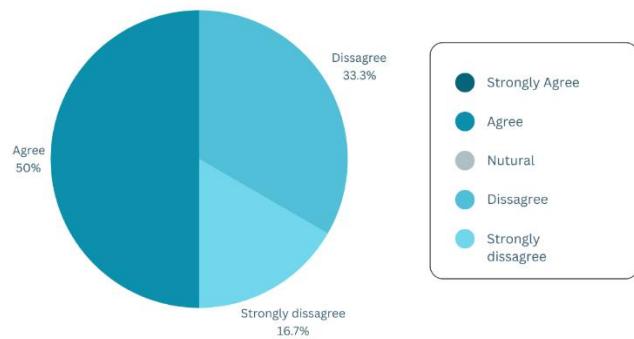
Q2: Did you find the opticheck interface device easy to use?



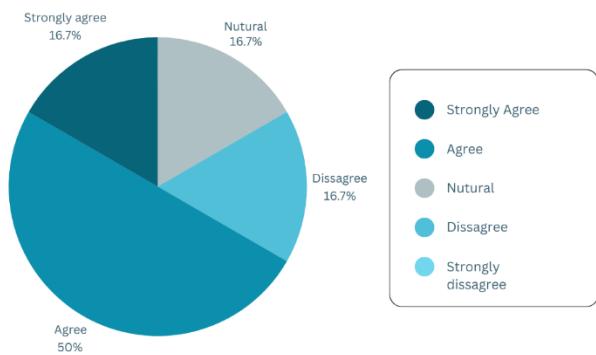
Q3: Were the instructions and guidance clear during your use of the device?



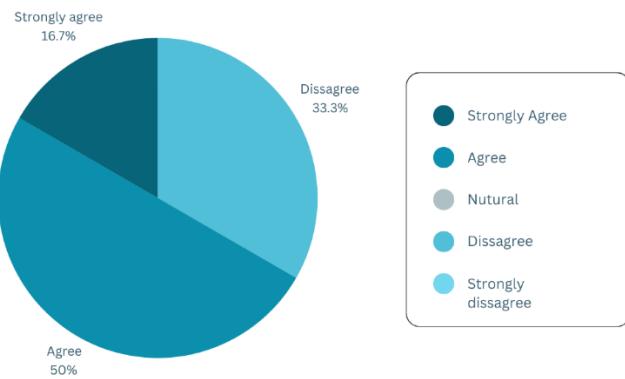
Q4: Was the eye examination process comprehensive and effective in your opinion?



Q5: Were you able to understand the results presented clearly?



Q6: Were you satisfied with the level of support and technical assistance provided during the use of the device?"



### 3.4. Satisfaction table

We posed various questions to our participants to gauge their satisfaction level with each task. The initial two tasks garnered exceptionally high averages above 4, whereas the last three tasks ranged from 3.28 to 3.9.

The questions assess user satisfaction, with each question graded on a scale of 1 to 5. For instance, Question #1: 'How satisfied were you overall with your experience with the OptiCheck application?'

Participants who strongly disagree are assigned 1 point, those who disagree receive 2 points, those who are neutral receive 3 points, those who agree are given 4 points, and those who strongly agree receive 5 points. Therefore, a higher score indicates higher satisfaction with the application.

Task	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	overall
	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.
1	5.0	3.9	4.2	3.9	4.6	3.7	4.2
2	3.7	4.5	3.8	4.6	4.4	3.8	4.1
3	4.5	4.0	2.9	4.4	3.8	4.2	3.7
4	3.4	3.3	2.8	2.5	3.7	4.0	3.28
5	4.6	3.7	3.5	5.0	4.0	3.0	3.9

### 3. Summary of Data

**Summary of Completion, Errors, Time on Task, Average Satisfaction**

Task	Task Completion	Errors	Time on Task	Satisfaction*
1	6	0	105	4.2
2	6	4	203.8	4.1
3	4	2	335.8	3.7
4	3	5	120.6	3.28
5	6	0	70.2	3.9

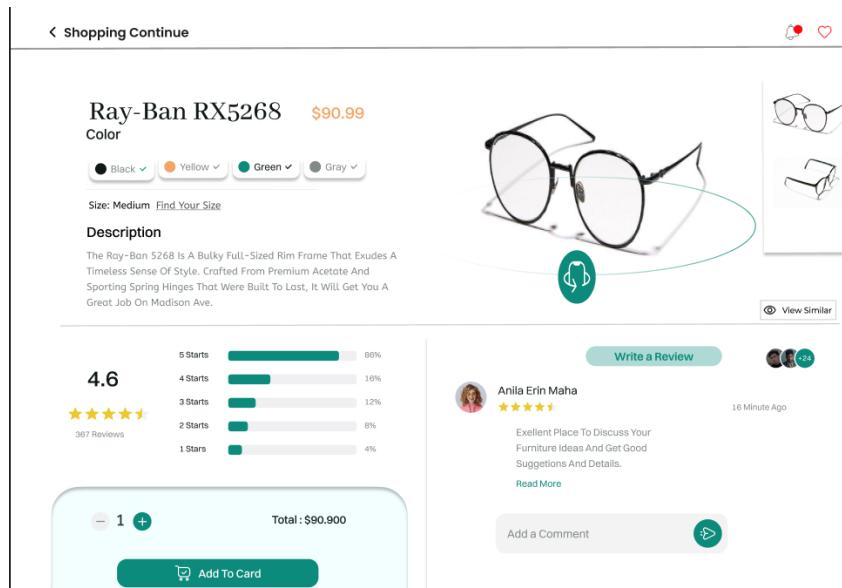
\* Satisfaction = Average you got from the questionnaire for each task.

#### Discussion:

##### 1. Critical Problem:

**Not being able to find the “Add to cart” button to complete the purchase.**

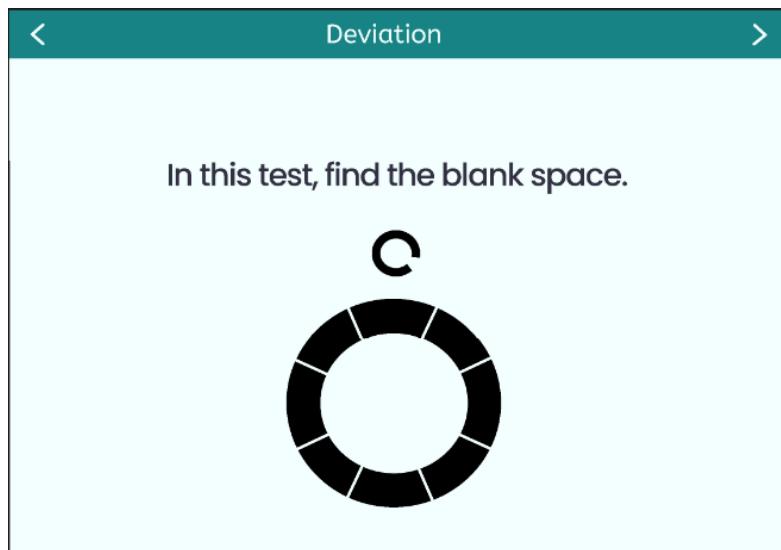
This is critical because it directly prevents users from completing a fundamental task, resulting in potential loss of sales and frustration.



## **2. Major Problems:**

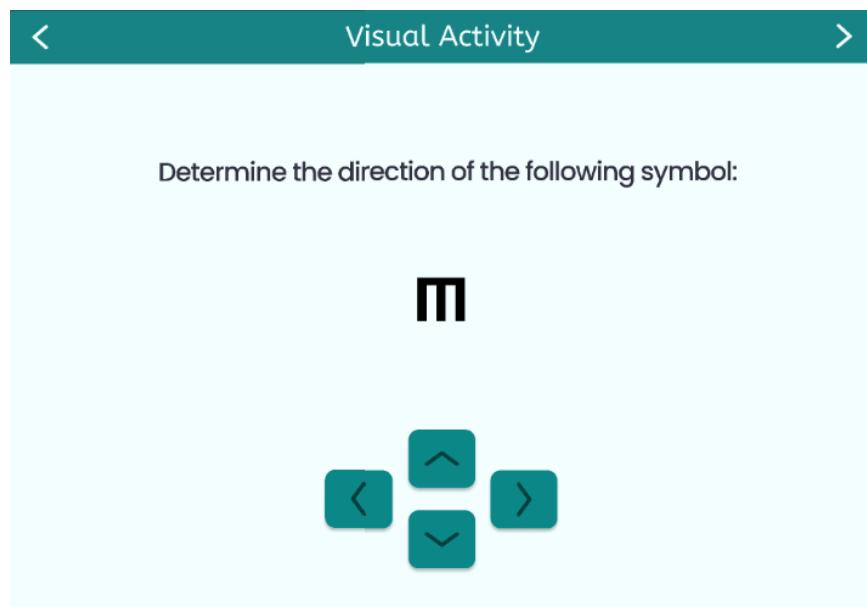
### **Misinterpreting the symbol due to not taking enough time to analyze.**

This is a major issue because it can lead to incorrect task completion and may cause frustration or dissatisfaction such as pressing the wrong answer.



### **Clicking randomly without observing the symbol properly.**

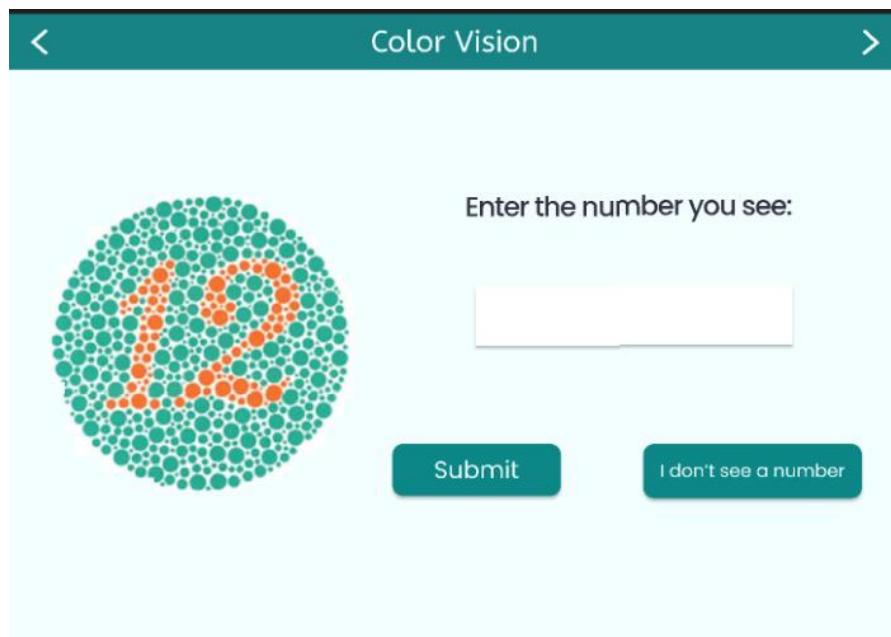
This is also a major problem as it indicates a lack of user engagement and may lead to errors or confusion in task completion.



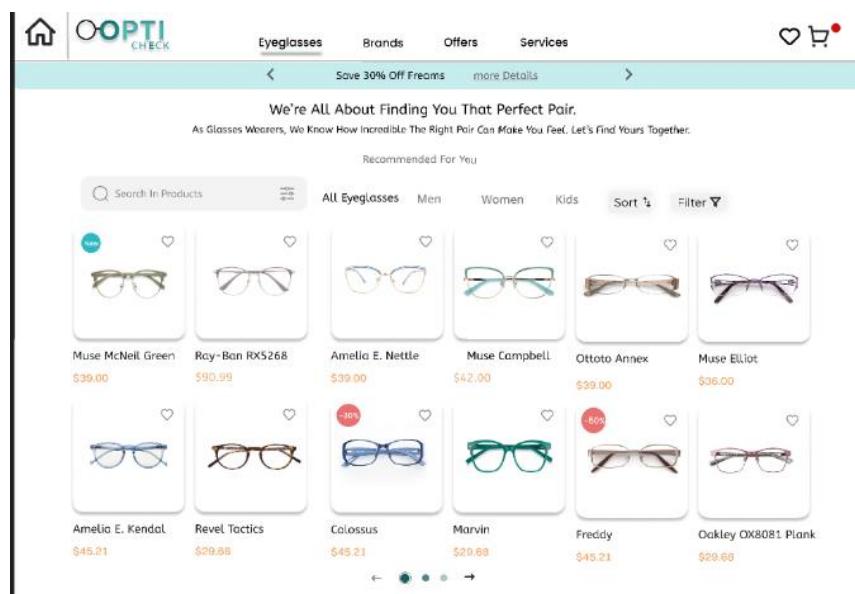
### **3. Minor Problems:**

**Misunderstanding the task and entering the color of the number displayed instead of the actual number.**

This is a minor issue because it may result in a small error, but it's unlikely to significantly impact the overall user experience.



**Adding multiple pairs of glasses to the cart without the intention of buying.**



## ***Step 5: Recommendations***

Drawing upon the findings from previous assessments of the initial model and incorporating insights garnered from participant feedback, it was observed that a notable cohort of participants encountered difficulties, notably with the color vision assessments. Moreover, the ocular measurement examination surpassed the anticipated timeframe, resulting in inefficiencies. Consequently, it is deduced that the provision of explicit and comprehensive instructions prior to the commencement of each examination would serve as an instrumental remedy. This approach aims to enhance participants' understanding of the assessment requirements and streamline the overall testing process, thus ensuring optimal efficiency and efficacy in the evaluation of OptiCheck.

Furthermore, it was noted that some participants encountered difficulties accessing certain buttons, such as the "Add to Cart" button. To address this issue effectively, it is imperative to position these buttons strategically within the interface, ensuring visibility and ease of access for the client. Additionally, incorporating distinctive colors for these buttons would enhance their prominence, distinguishing them from the surrounding elements on the page. This approach aims to optimize user interaction and navigation within the OptiCheck application, facilitating a seamless and intuitive user experience. Implementing these adjustments will not only improve usability but also contribute to overall user satisfaction and engagement with the platform.

## Appendix A: Consent Form



### OptiCheck Application Trial Consent

I, [Participant's Name], acknowledge and agree to participate in the trial dedicated to the OptiCheck application, subject to the terms and conditions outlined below:

1. Trial Phases: I fully understand that participating in this trial will involve several phases, including:

- Testing and evaluating the performance and usability of the application.
  - Undergoing various vision tests to assess visual capabilities and the effectiveness of the application in meeting needs.
  - Experiencing the purchasing and payment process in a closed environment to evaluate the smoothness and the effectiveness of the purchasing and financial transactions.
2. Feedback and Evaluation: I commit to providing feedback and observations truthfully and transparently based on my experience with the application. My feedback will be valuable for the development of the application and improving the user experience in the future.
3. Confidentiality and Privacy: I understand and agree that the data I provide will be confidential and used solely for research and development purposes of the OptiCheck application. This data will not be shared with any company or external party.

I acknowledge that I have read and fully understood these terms and agree to fully comply with them during the period of participation in the trial.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## **Appendix B: Facilitator Script**

Picture this: You're a busy professional who values both style and efficiency. However, your hectic schedule leaves little time for traditional eyewear shopping. In your quest for a solution, you stumble upon OptiCheck, a revolutionary machine that offers a seamless eyewear shopping experience.

Excited by the prospect of finding your perfect pair with just a few clicks!

### **TASCKS:**

1. Create a new user account.
2. Perform visual acuity test.
3. Perform color vision test.
4. Payment
5. Use smart camera to select perfect glasses.

## **Appendix C: Questionnaires Script**

Q1: How satisfied were you overall with your experience with the OptiCheck application?

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Q2: Did you find the opticheck interface device easy to use?

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Q3: Were the instructions and guidance clear during your use of the device?

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Q4: Was the eye examination process comprehensive and effective in your opinion?

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Q5: Were you able to understand the results presented clearly?

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Q6: Were you satisfied with the level of support and technical assistance provided during the use of the device?"

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree