

Creative Computing CCY4

Project Appendices

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30/04/2026

Contents

| | | |
|-----|--|----|
| 1. | Sprints | 2 |
| 2. | Jacob Nielsen’s 10 Usability Heuristics | 8 |
| 3. | List of Product Ingredients | 8 |
| 4. | Issues in Implementation Table..... | 9 |
| 5. | Miro Link | 11 |
| 6. | Figma Link..... | 11 |
| 7. | Survey: Skincare Product Decision Survey | 12 |
| 8. | Survey: Product Suitability App – Feature Expectations | 20 |
| 9. | Survey: User Testing Survey | 25 |
| 10. | Permissions Table | 30 |
| 11. | User Testing Tasks | 31 |
| 12. | All Consent Forms | 36 |
| 13. | Transcripts (Isobel, Edvardas) | 51 |
| 14. | Download Script | 54 |
| 15. | RAG Papers Used | 56 |
| 16. | Links to Hosted Server and Hosted Admin Panel..... | 57 |
| 17. | Jest and SuperTest Tests | 58 |

1. Sprints

Sprint: **Sprint 1**

Start Date: 02/02/26

End Date: 16/02/26

Goals | *Discuss goals required to complete in this sprint*

Week 1: By the end of week 1 we should have a basic database with user authentication set in, including user roles, user seeding, and protected routes.

- Implement PostgreSQL, create a mock database
- Begin Node Instance, install relevant packages,
- Create user models,
- Create user role middleware and separate admin from ordinary user roles, set policies for each role
- Create a router within index.js, set up protected routes
- Create a seeder and seed three users for each role.
- Create a user/auth Controller- register, login and logout
- Complete User Authentication + **User CRUD**
- Test User Authentication within the REST client

Week 2: By the end of week 2 we should have finalised the user authentication, with the relevant roles attached, with relevant policies and permissions. Began working on client side with testing different LLM keys for result evaluation.

Convert backend code to TypeScript to match front end.

- Create Profile model alongside its controller
- Convert to typescript
- Add user permission and policies for each role
- Began Client side, test Gemini and OpenAI keys

Testing

- Test for database entry – is the user appearing in the database?
- Test register, does it auto-log in the user?
- Test logout – does the token get removed?
- Can a user only update their own user details?
- Can the admin (only admin) CRUD the Preferences
- Is backend working correctly after typescript conversion

Sprint: Sprint 2

Start Date: 16/02/26

End Date: 02/03/26

Goals | *Discuss goals required to complete in this sprint*

Week 1: By the end of week 1, we should have user authentication fully complete, including s3 profile image storage, with a token the user must enter into the REST client. Furthermore, we should have set up the TypeScript Environment with API keys for Gemini and . Finally, we should set up an ingredient pulling system using InciDecoder.

- Create S3 Bucket
- Finalise Draft ERD
- Work on Mobile Wireframes
- Organise Thesis Headings and re-read the research chapter
- Work on Functional, Non-Functional and System Requirements.
- Using the client-side pull ingredients from the product based on image analysis with the chosen LLM Model.

Week 2: By the end of week 2, we should have a mock evaluation system, taking in the user's hard-coded skin condition, hardcoded product, ingredient pulling for said product and a final evaluation that is stored in the database attached to the user id.

- Take the ingredient list pulled from the product.
- Collect user skin condition information [hard-coded].
- Preprocess ingredients and skin condition data for consistency.
- Design prompts to ask the AI if the product is suitable for the user.
- Use prompt engineering to guide Gemini's analysis (e.g., highlight irritants, allergens).
- Generate suitability analysis and explanations from Gemini.
- Store or return the analysis for frontend display or further processing

Testing

- Test for user reset password, does the token expire correctly?
- Test for user reset password, does the token match and allow the user to reset the password.
- Test for user reset password, does the reset password button correctly trigger the event to send a token to the user's email?
- Using ingredients, can we prompt the user for a skin condition and, using Gemini, evaluate the product?
- Are RAG vectors storing correctly?
- Does the evaluation get stored in the database using the user ID.

Sprint: Sprint 3

Start Date: 02/03/26

End Date: 16/03/26

Goals | *Discuss goals required to complete in this sprint*

Week 1: By the end of week 1, we should have completed the remaining goals from the last sprint. Additionally, we should have connected the backend to the frontend, created a landing screen for the front end, with a basic registration/login screen, and replaced hardcoded user data in the backend for analysis.

- Connect backend frontend(locally)
 - Began frontend design and began landing page
 - Create basic register and login pages (with auth)
- Replace User data for analysis entities with user inputted data

Week 2: By the end of week 2 we should have implemented profile features in the frontend (connecting profile to registration) and tested via expo. In the backend we began coding conditions, preferences, and allergens. Connecting them with the respective ERD set relationships and improve navigation in the front end. Finally attaching conditions, preferences, allergens to the profile create and test in backend.

- Implement profile features in the frontend
- Implement conditions entity
- Implement allergen entity,
- Implement preference entity
- Connect analysis entities to the profile and test store.
- Connect all analysis entities correctly via Prisma based on ERD relationships.

Testing

- Test CRUD Preference
- Test CRUD Allergen
- Test CRUD Condition
- Test Register -> Profile (Frontend)
- Test Landing Screen is appearing on user phone and does not allow to be viewed by unauthenticated users. (guest)
- Test Navigation Routes

Sprint: Sprint 4

Start Date: 16/03/26

End Date: 07/04/26

Goals | *Discuss goals required to complete in this sprint*

Week 1: By the end of week 1, we should implement seed preferences, conditions and allergens with real data. Implement Prompt entity and seed prompts. Implement the Product entity and attach ingredient extraction via the Gemini flash model, and remove the Inci decoder as it is unreliable. Began Evaluation Context entity. Implement RAG and attach to Gemini analysis. Chunk relevant papers.

- Seed allergen
- Seed Condition,
- Seed Preference,
- Implement Prompt Entity,
- Implement the Product entity and attach ingredient extraction
- Remove Inci Decoder
- Began Evaluation Context entity
- Implement RAG and store on Pinecone.

Week 2: By the end of week 2, we need to complete the evaluation context entity and the seed prompt entity, based on the Enum of categories via the product and prompt entity. Attach relevant permissions and policies based on user role for all new entities. Test evaluation context, prompt output, and finalise the registration->profile/login process for the frontend. Implement RAG and attach to Gemini analysis. Attach Google, Apple, GitHub auth logins.

- Complete evaluation context entity.
- Attach the Gemini model to the evaluation context entity.
- Create Prompt objectives based on categories.
- Attach permissions and polices, test per user role
- Generate suitability analysis and explanations from Gemini.
- Store or return the analysis for frontend display or further processing
- Create API keys for each auth method and implement in front + backend.

Testing

- Test CRUD product entity.
- Test CRUD prompt entity
- Test Prompt seeded objects.
- Test Image upload/ingredient extraction based on Gemini flash model
- Test CRUD evaluation context entity.
- Can we implement RAG and use the stored vectors and attach does to the evaluation using the stored vectors?
- Does the evaluation get stored in the database using the user ID.
- Test login with additional auth methods via expo.

Sprint: Sprint 5

Start Date: 07/04/26

End Date: 21/04/26

Goals | *Discuss goals required to complete in this sprint*

Week 1: By the end of week 1, we should finalise screens for: welcome, landing, analyse result, image capture, history, register, login and additional minor screens. Set up object detection via package (tbc) for camera screen. Host the backend on the chosen hosting platform and reattach the front end to the hosted backend. Complete navigation and add minor design aesthetics to screens. Began paperwork and necessary testing tasks for user testing.

- Complete all screens
- Host on Render and attach frontend to hosted backend
- Complete navigation and add minor design aesthetics.
- Began paperwork necessary for user testing, such as consent forms, testing tasks and scripts.
- Implement object detection via detection package and test on multiple different objects.

Week 2: By the end of week 2, we should have the front end finalised and ready for testing, and all testers and tasks allocated and set up. Full test of backend to front end and add additional loading screens, and test performance back-to-back. Re-test and validate the response from: object detection, ingredient extraction, analysis and re-analysis. Add any additional features, such as feedback on the analysis response or profile transfer, if there is time.

- Testing paperwork is completed and testing tasks are allocated to testers.
- Back-to-back testing from new hosted backend
- Add additional loading screens.
- Test performance back-to-back
- Re test performance for object detection.
- Re-test performance for analysis and re-analysis
- Re-test performance for ingredient

Testing

- Test all screens + navigation, make sure everything works properly and nothing breaks
- Test frontend connection to hosted backend (login/register + pulling data)
- Test object detection + image capture on different objects
- Test full flow from image → ingredients → analysis → result
- Test analysis vs re-analysis, are results consistent?
- Test saving and pulling evaluation history per user
- Test performance with back-to-back requests (API + frontend)

- Test error handling + loading screens (failed requests, slow responses, bad input) Can we implement RAG and use the stored vectors and attach does to the evaluation using the stored vectors?
- Does the evaluation get stored in the database using the user ID.

Sprint: Sprint 6

Start Date: 21/04/26

End Date: 31/04/26

Goals | *Discuss goals required to complete in this sprint*

Week 1: By the end of week 1, we create the post-testing survey, complete user testing, and cite all findings in the main report. Add any additional fixes to the frontend from user testing. Complete reflection, introduction and future work in the report. Finally, add front-end testing with Jest & SuperTest.

- finalise all screens
- Fix any minor issues based on user testing's
- Cite user findings
- Complete reflection, introduction and future work chapters.
- Add any frontend testing as needed with Jest and SuperTest

Week 2: By the end of week 2, we should re-check all performances and finalise the sprint schedule subchapter in the report. Additionally, we should re-run all testing on the backend and frontend.

- Re-check performance of ingredient extraction
- Re-check analysis and re-analysis
- Re-run integration tests front and backend
- Re-run unit tests for the front and backend.

Testing

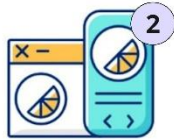
- Test full app after user testing changes (all screens + navigation still working)
- Test frontend + backend connection after fixes (no broken endpoints)
- Test ingredient extraction, analysis and re-analysis after updates
- Test performance again (back-to-back requests, response times)
- Test integration between frontend and backend (full user flow)
- Test unit + integration tests (frontend + backend using Jest & SuperTest)
- Test for any new bugs introduced from fixes or changes
- Test overall usability improvements based on user feedback

2. Jakob Nielsen's 10 Usability Heuristics

Jakob Nielsen's 10 Usability Heuristics



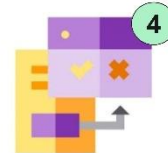
1
Visibility of system status



2
Match between system and the real world



3
User control and freedom



4
Consistency and standards



5
Error prevention



6
Recognition rather than recall



7
Flexibility and efficiency of use



8
Aesthetic and minimalist design



9
Help users recognize, diagnose, & recover from errors



10
Help and documentation

This diagram was adapted from [Aufait UX heuristic evaluation article](#)

3. List of Product Ingredients

Official Ingredients: Aqua, Stearyl Alcohol, Behentrimonium Chloride, Cetyl Alcohol, Bis-Aminopropyl Dimethicone, Parfum, Isopropyl Alcohol, Benzyl Alcohol, Citric Acid, Sodium Benzoate, Tocopheryl Acetate, Disodium EDTA, Polysorbate 20, Panthenol, Panthenyl Ethyl Ether, Niacinamide, Histidine, Hexyl Cinnamal, Hydroxycitronellal, limonene

4. Issues in Implementation table

Errors occurred: Rows highlighted in yellow indicate where AI-assisted code generation was used, while rows highlighted in green represent sections where AI was utilised for explanatory support.

| # | Error / Issue | Category | Stage | Cause | Resolution |
|----|---|----------------|----------------------|---|---|
| 1 | Backend and frontend could not be connected when testing via Expo Go | Server | Early Development | The mobile device and backend server were not on the same Wi-Fi network, preventing communication | Checked terminal output and ensured both devices were connected to the same network |
| 2 | User profile was not linked to the correct user during registration | Server | Early Development | The authenticated user token was not included, so the system could not retrieve the user ID | Implemented a GetCurrentUser method to correctly associate profiles with the user ID |
| 3 | AWS S3 access issues prevented users from retrieving product resources | Server | Mid Development | IAM policies were incorrectly configured, blocking access even when read permissions appeared enabled | Reviewed and corrected IAM roles and bucket policies |
| 4 | Stored product images could not be retrieved from S3 | Implementation | Mid Development | A mismatch between how images were stored and retrieved caused access failure | Corrected inconsistencies in image handling logic |
| 5 | Ingredient extraction returned incorrect or null values using INCI Decoder | Implementation | Mid-Late Development | INCI Decoder produced inconsistent outputs and soft failures when parsing AI-generated ingredient text | Replaced INCI Decoder with Gemini for more reliable extraction |
| 6 | External APIs for conditions and allergens were unusable | Implementation | Late Development | APIs lacked documentation, had incomplete data, were expensive, or required scraping | Replaced with internally seeded dataset and implemented admin CRUD functionality |
| 7 | RAG implementation significantly increased response time | Implementation | Late Development | Additional steps such as embedding retrieval and prompt augmentation increased latency | Accepted as a trade-off for improved contextual accuracy |
| 8 | Third-party authentication (Apple, Google, GitHub) could not be fully implemented | Server | Late Development | Apple required a paid developer account, while Google and GitHub failed due to incorrect redirect URIs in Expo Go | Retained implementation but left features non-functional without EAS/production setup |
| 9 | ML Kit real-time object detection could not be implemented | Implementation | Late Development | Required EAS build services which were unavailable within project constraints | Feature was not implemented and alternative scanning approach was used |
| 10 | EAS build could not be used due to lack | Implementation | Late Development | iOS builds required macOS which was not available | Limited iOS testing and avoided EAS-based features |

| # | Error / Issue | Category | Stage | Cause | Resolution |
|----|--|----------------|------------------|---|--|
| | of macOS environment | | | | |
| 11 | EAS build restricted due to Apple Developer account cost | Implementation | Late Development | Apple Developer Program required €99/year subscription which was outside project budget | Avoided use of EAS deployment features requiring Apple credentials |
| 12 | Gemini API rate limiting restricted RAG dataset size | Implementation | Late Development | API tier limits caused failures when processing more than ~12 research papers and broke Pinecone uploads | Limited dataset to 12 papers based on testing within API constraints |
| 13 | Frontend state (isComplete) was not updating correctly | Client | Late Development | Conflicting conditional logic created a false positive where the frontend showed true but backend remained false, with no clear logging | Simplified conditional logic after analysing issue with AI (Copilot) |
| 14 | Gemini model latency required switching models | Implementation | Late Development | Performance limitations in Gemini Flash 2.5 caused slow response times | Switched to Gemini Flash 2.5 Lite following performance improvements |
| 15 | Gluestack documentation inconsistencies slowed UI development | Client | Late Development | Component usage varied significantly across versions with limited documentation for the version used | Generated an AI-assisted cheat sheet to standardise usage |
| 16 | Styling conflict between NativeWind and Gluestack | Client | Late Development | NativeWind was incompatible with the Gluestack styling system | Removed NativeWind and used inline/component-based styling |
| 17 | Prisma client failed to initialise during deployment | Server | Late Development | Deployment environment did not correctly run Prisma generation steps | Updated build command to match local development setup |
| 18 | Incorrect citation links in AI-generated JSON output | Implementation | Late Development | Model-generated citation structure but lacked consistent mapping to actual source links | Created asset mapping RAG papers to hosted links for correct citation output |
| 19 | Evaluation context prompt was being overwritten | Implementation | Late Development | Prompt entity structure caused main evaluation prompt to be overridden, leading to inconsistent responses | Refactored relationships to allow modular prompt composition |
| 20 | Integration testing failed due to strict typing with Supertest | Server | Late Development | Strong TypeScript typing conflicted with Supertest request handling and middleware (e.g., next functions) | Reduced test scope and created representative integration test files |
| 21 | Repeated 503 errors from external API | Client | Late Development | Requests failed due to high frequency and lack of retry logic, causing immediate failure | Refactored logic to allow retry attempts instead of failing immediately |

| # | Error / Issue | Category | Stage | Cause | Resolution |
|----|--|----------------|------------------------|--|---|
| 22 | React Native navigation inconsistencies | Client | Late Development | State and caching issues caused incorrect screens/components to render after reloads | Used more direct component linking instead of relying fully on navigation state |
| 23 | queueMicrotask error occurred only on local device | Implementation | Late Development | Likely caused by Node/NVM inconsistencies or dependency issues, though exact cause was unclear | Implemented custom microtask handler and imported into core server files |
| 24 | Difficulty designing mobile UI due to limited experience | Client | Throughout Development | Greater experience in web development made adapting to mobile UI paradigms challenging | Improved UI iteratively using testing, experimentation, and component libraries |

5. Miro Board

Miro Link: https://miro.com/app/board/uXjVJBYSjNM=?share_link_id=159790122455

6. Figma Board

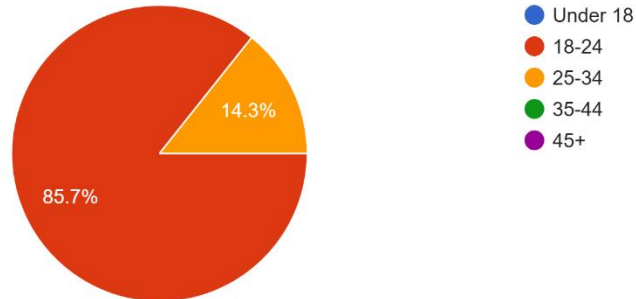
Figma Link:

<https://www.figma.com/design/ivB38UFTVyuOW0WCgEVWUz/MajorProject?node-id=0-1&m=dev&t=39j2XidqhPF4Vyfu-1>

7. Survey: Skincare Product Decision Survey

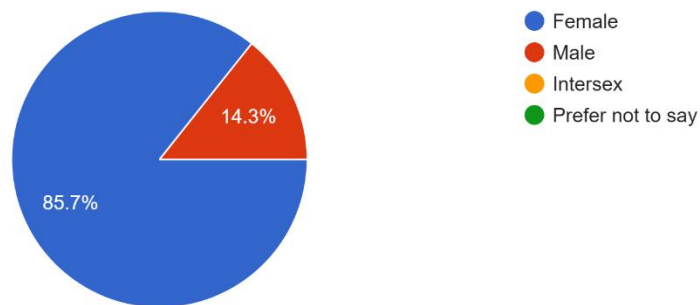
1. What age group are you in?

7 responses



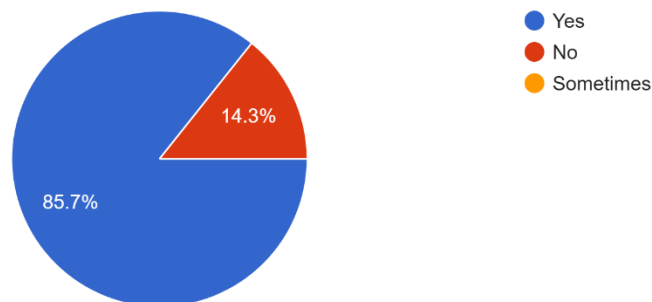
2. What is your biological sex?

7 responses



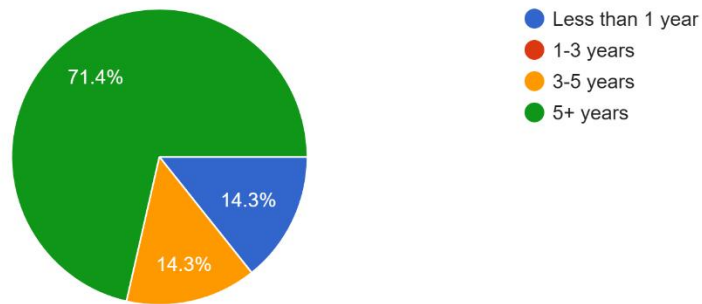
3. Do you have any ongoing skin concerns or conditions?

7 responses



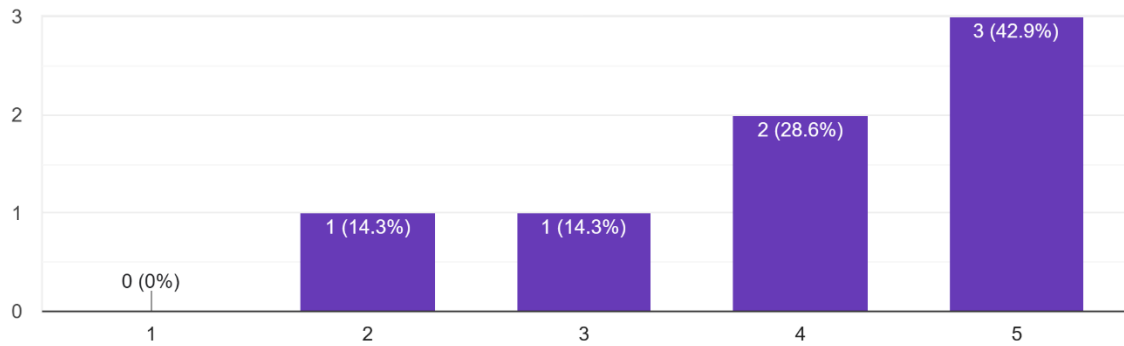
4. If yes, how long have you been dealing with it?

7 responses



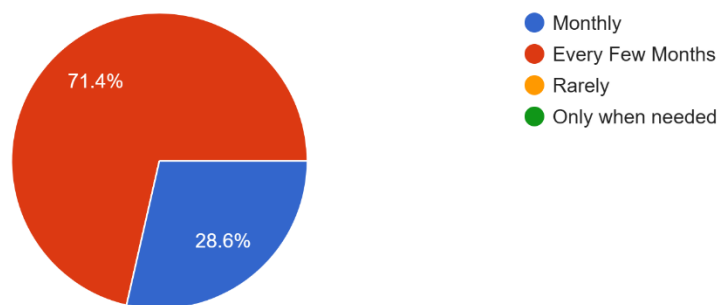
5. How important is skincare/cosmetic safety to you? (1–5 scale)

7 responses



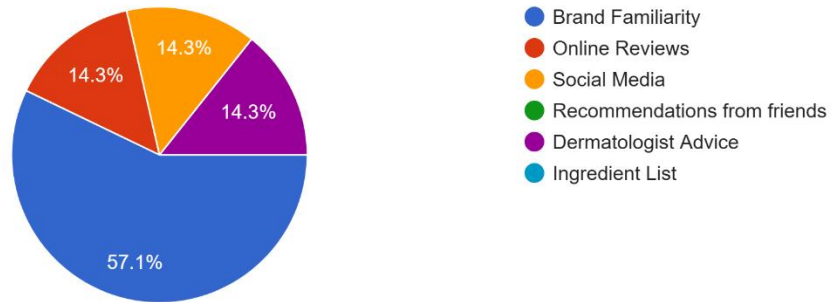
6. How often do you purchase skincare or cosmetic products?

7 responses



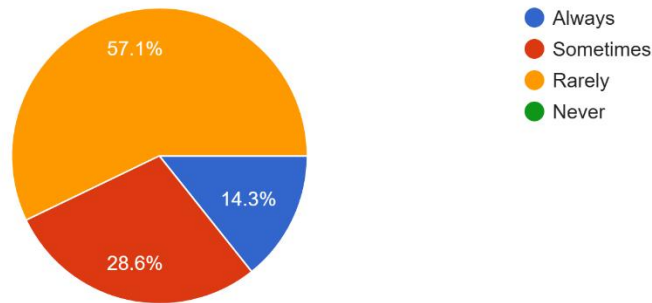
7. When buying a new product, what do you usually rely on?

7 responses



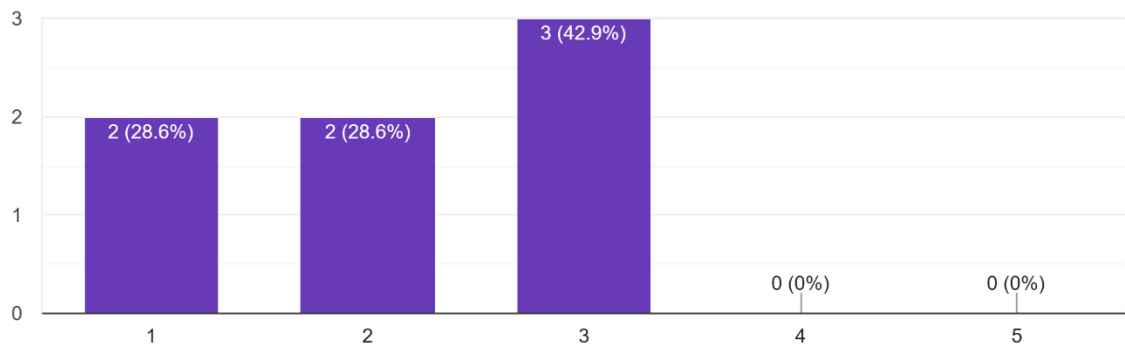
8. Do you read ingredient labels before buying?

7 responses



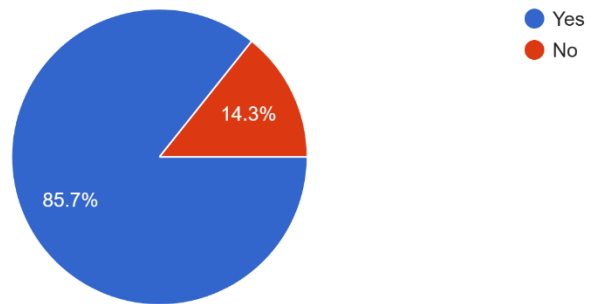
9. How confident do you feel understanding ingredient lists? (1–5 scale)

7 responses



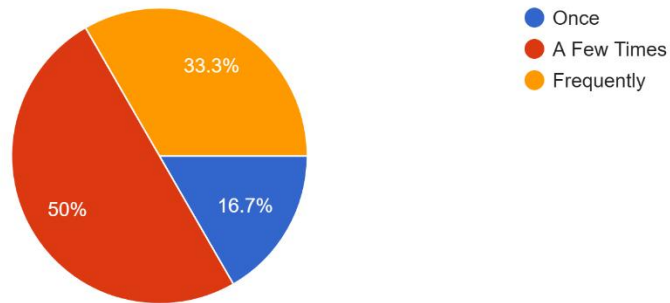
10. Have you ever purchased a product that negatively affected your skin?

7 responses



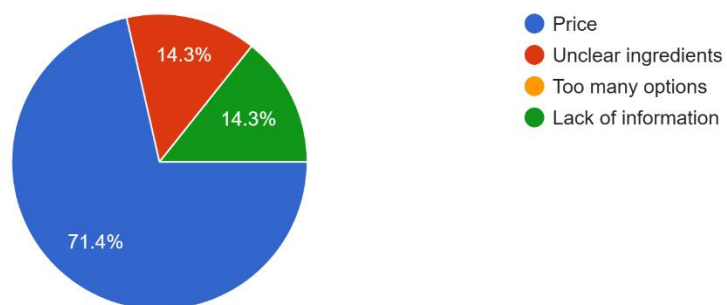
11. If yes, how often has this happened?

6 responses



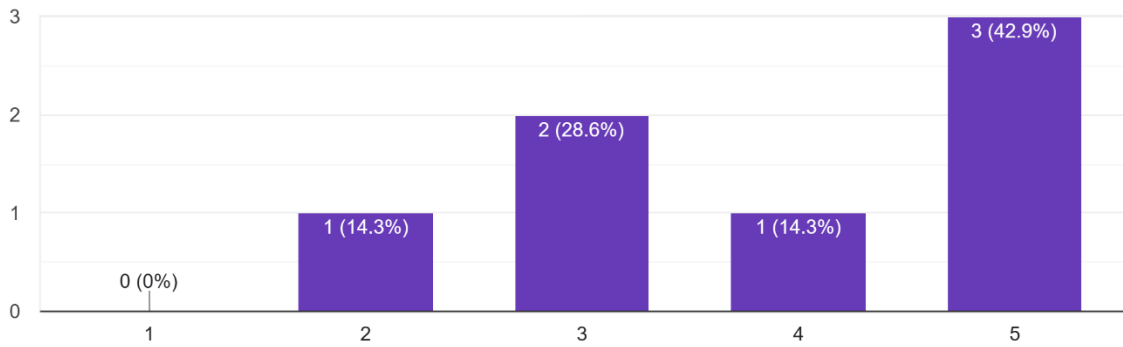
12. What usually causes hesitation when buying a product?

7 responses



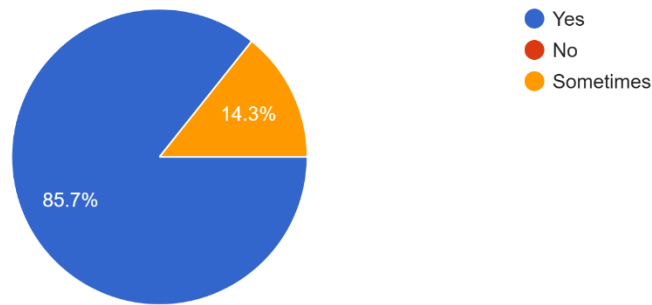
13. On a scale of 1–5, how stressful is choosing new skincare products?

7 responses



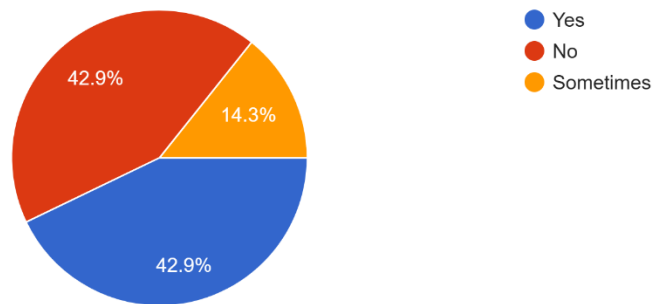
14. Do you feel there is too much conflicting information online about skincare?

7 responses



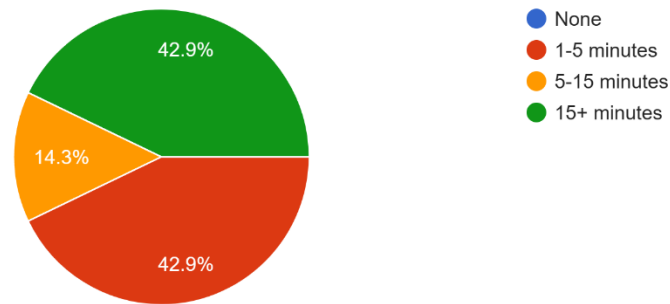
15. Have you ever spent extra time researching ingredients before purchasing?

7 responses



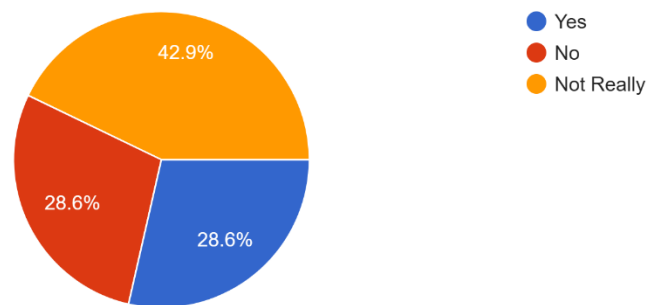
16. Approximately how long do you research before buying something new?

7 responses



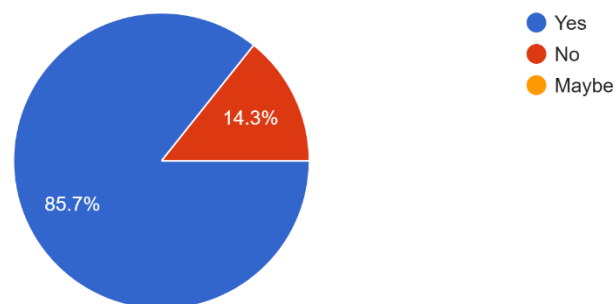
17. Do you feel current tools (Google, TikTok, blogs, etc.) give you personalised advice in forms of advertisements?

7 responses



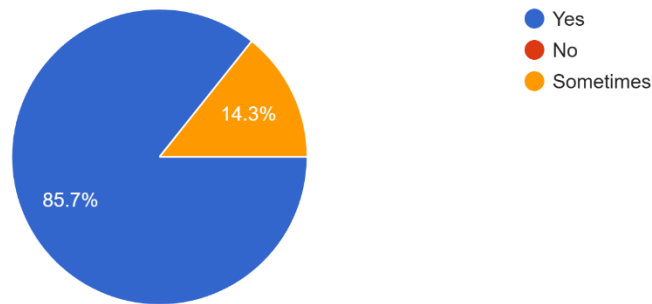
18. Have you ever avoided buying a product because you weren't sure if it was suitable?

7 responses



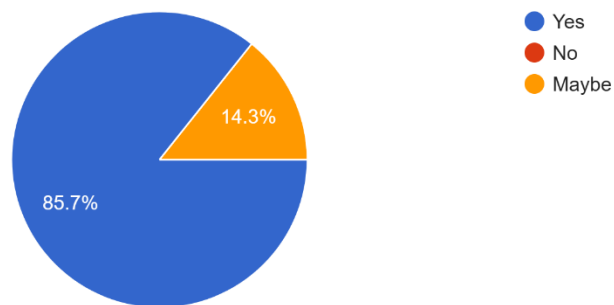
19. Would you say product selection feels overwhelming at times?

7 responses



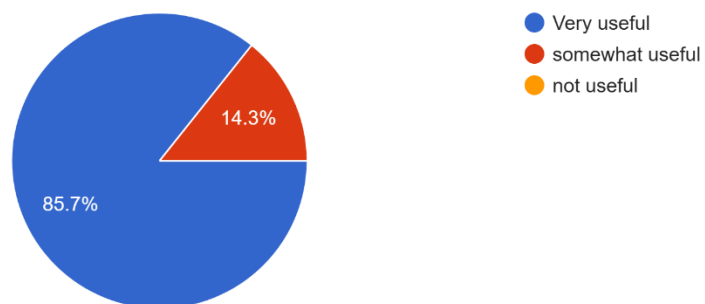
20. Would you find it helpful to have a quicker way to check if a product suits your specific skin needs?

7 responses



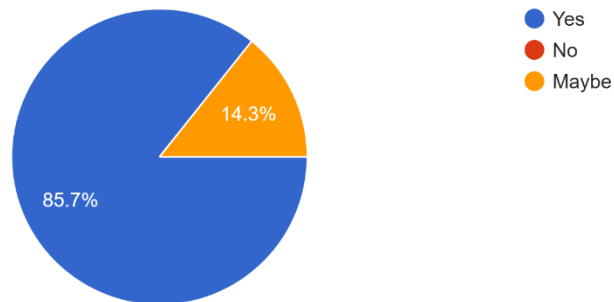
21. Would personalised guidance based on your own skin profile be useful?

7 responses



22. Would you use a digital tool to simplify ingredient checking?

7 responses



23. What would make choosing skincare products easier for you? (Not Required)

7 responses

Clear explanation of ingredients and their origins

A score based system that balances skin needs, quality and price?

Insight on ingredients and why suits certain skin types

if i could answer questions about my skin and you would diagnose a skin type and recommend product that will work

AN APP THAT EXPLAINS INGREDIENTS

Filtering by price range and skin type

24. What frustrates you most about the current process?

7 responses

Unclear ingredients and percentage amount within products

Too many options

Lack of information

too hard to find something that is specifically my skin type, most of the time its close enough after a long time of research but never exactly what I need

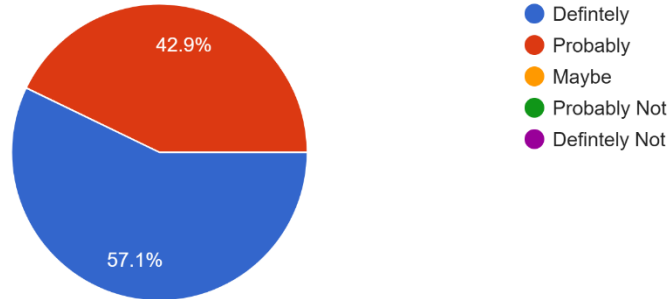
UNCLEAR IF AN AMOUNT OF INGREDIENT IS ENOUGH TO MAKE A DIFFERENCE

High risk as most products are expensive

8. Survey: Product Suitability App – Feature Expectations

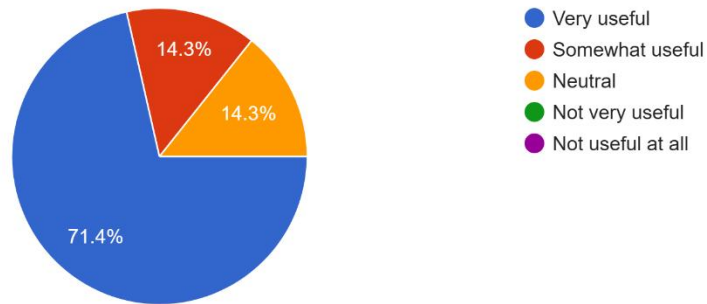
1. Would you use an app that helps determine whether a skincare product suits your specific skin needs?

7 responses



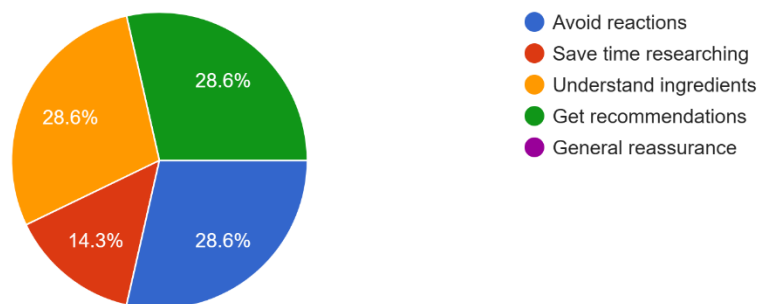
2. How useful would personalised product analysis be to you?

7 responses



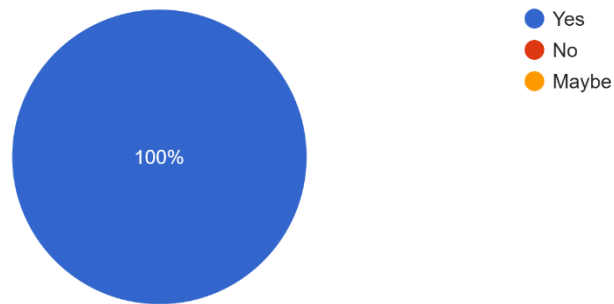
3. What would be the primary reason you would use such an app?

7 responses



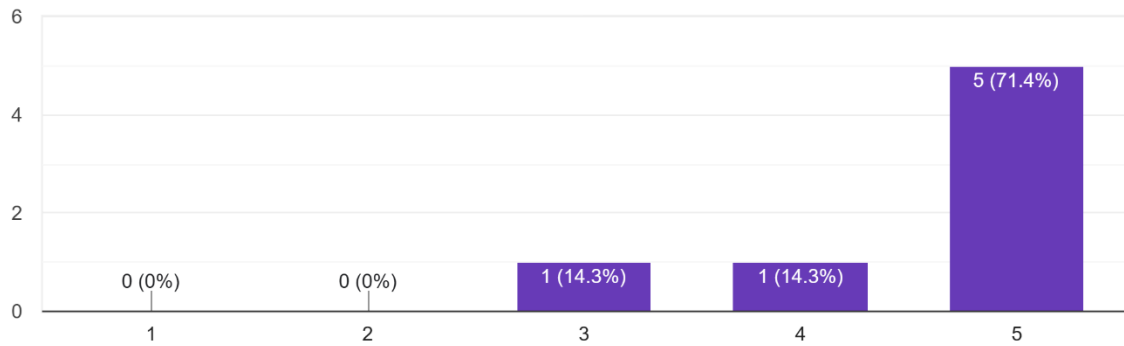
4. Would you like the app to explain why certain ingredients may or may not suit you?

7 responses



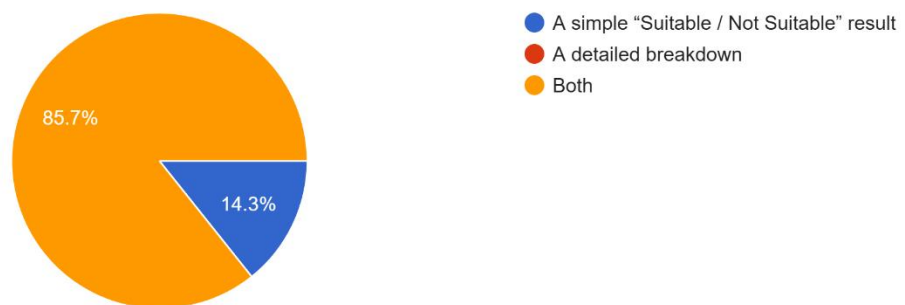
5. How important is ingredient transparency to you? (1–5 scale)

7 responses



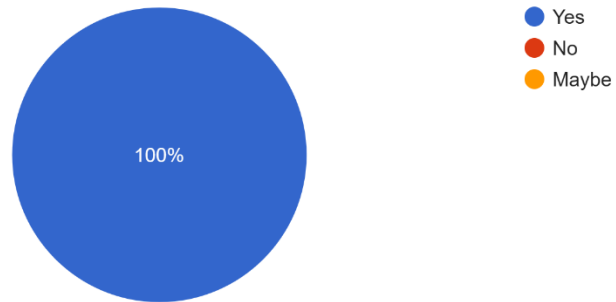
6. Would you prefer:

7 responses



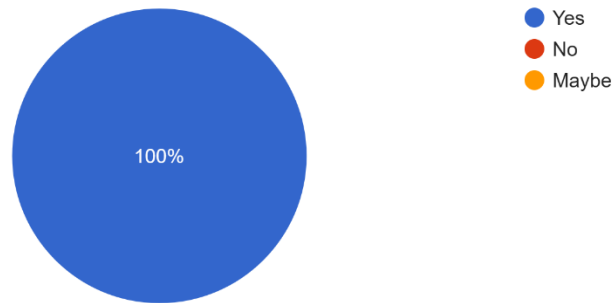
7. Would you be willing to input your skin condition(s) to receive personalised results?

7 responses



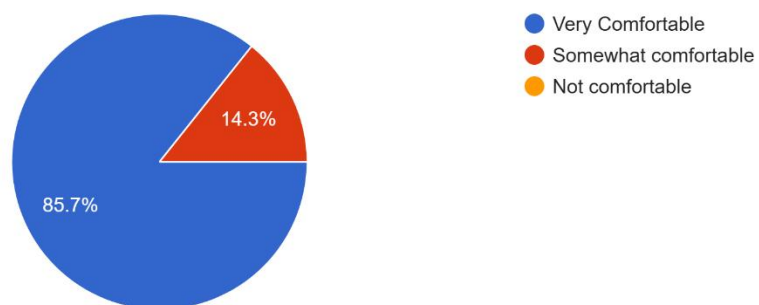
8. Would you input known allergens to improve accuracy?

7 responses



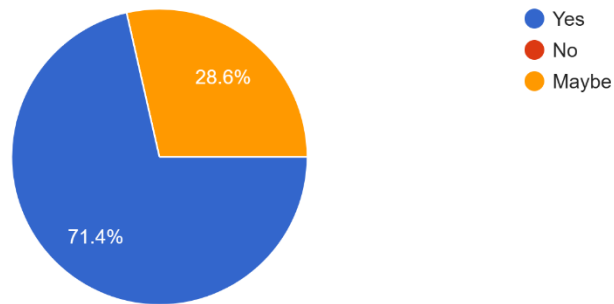
9. How comfortable are you with an app storing your skin profile for better recommendations?

7 responses



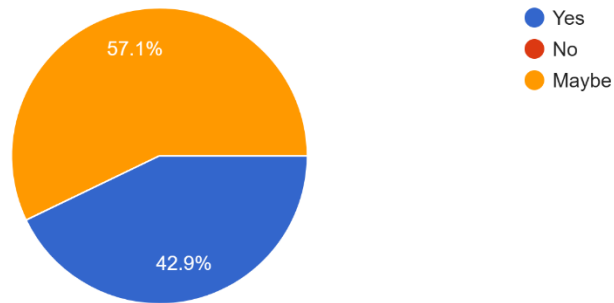
10. Would you like the app to learn from products you liked or disliked?

7 responses



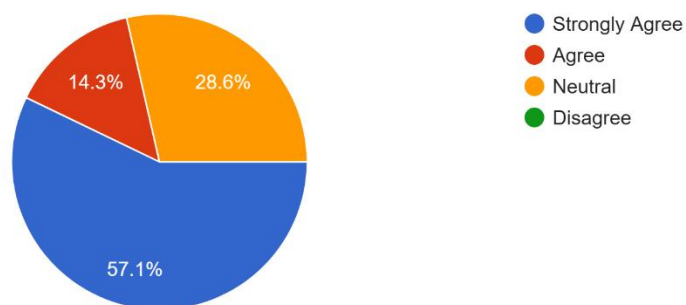
11. Would a simple thumbs up / thumbs down feedback system be sufficient?

7 responses



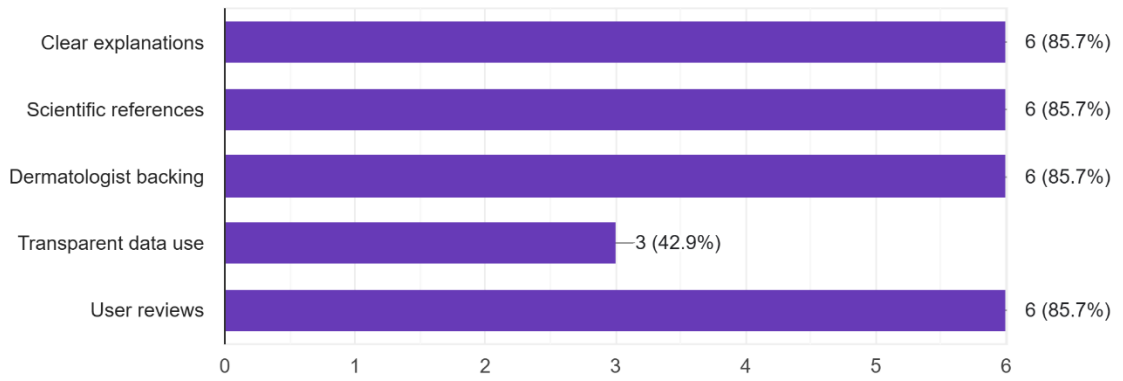
12. Would personalised product recommendations influence your purchasing decisions?

7 responses



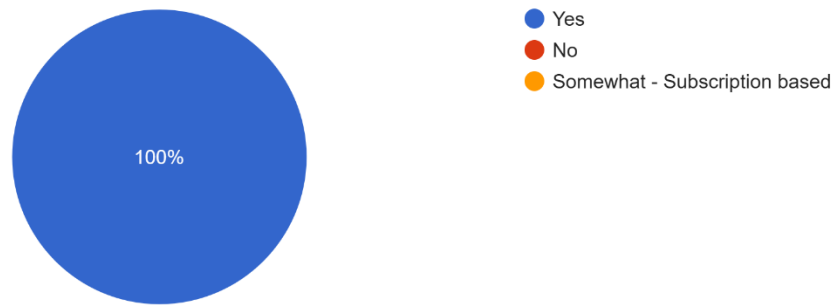
13. What would make you trust such an app?

7 responses



14. Would you download this app if it were free?

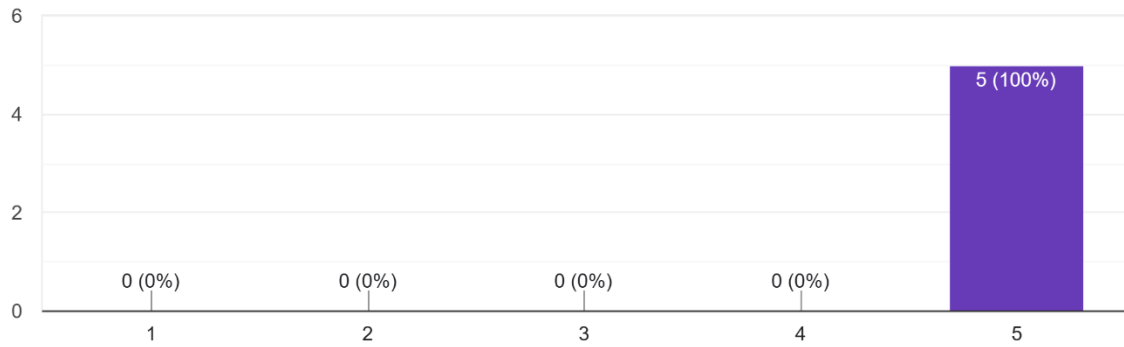
7 responses



9. Survey: User Testing Survey

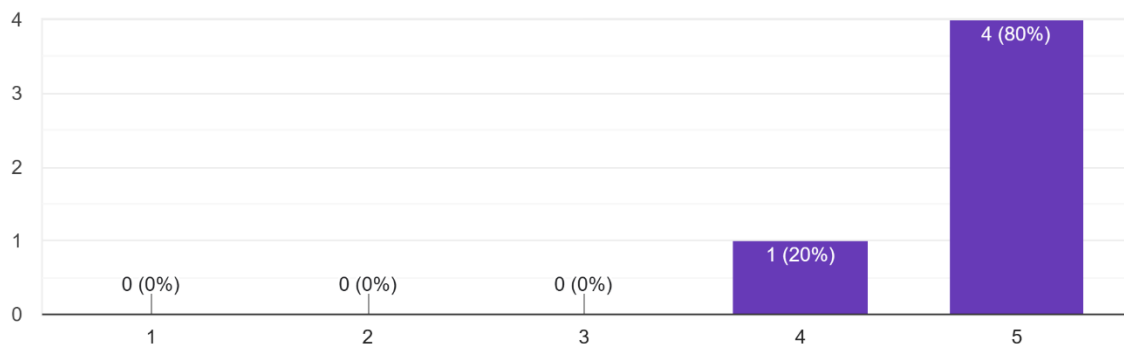
1. How easy was the app to use?

5 responses



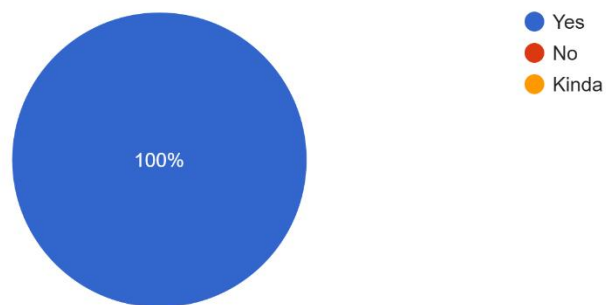
2. I felt confident using the app without help

5 responses



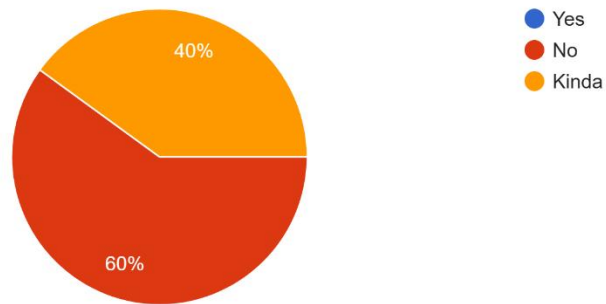
3. Was the app easy to navigate?

5 responses



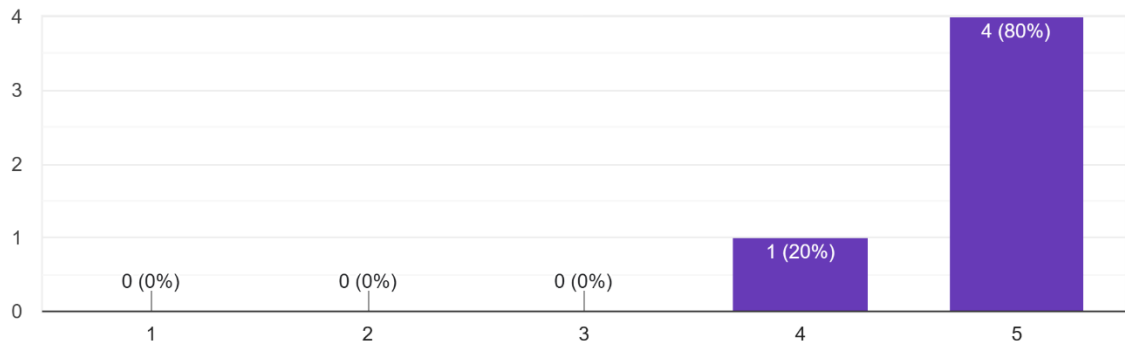
4. Did you experience any lag or slow loading?

5 responses



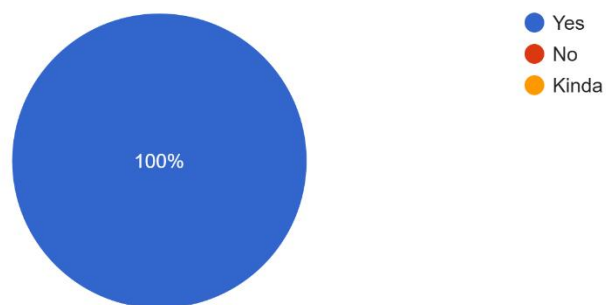
5. The layout and design were clear and understandable

5 responses



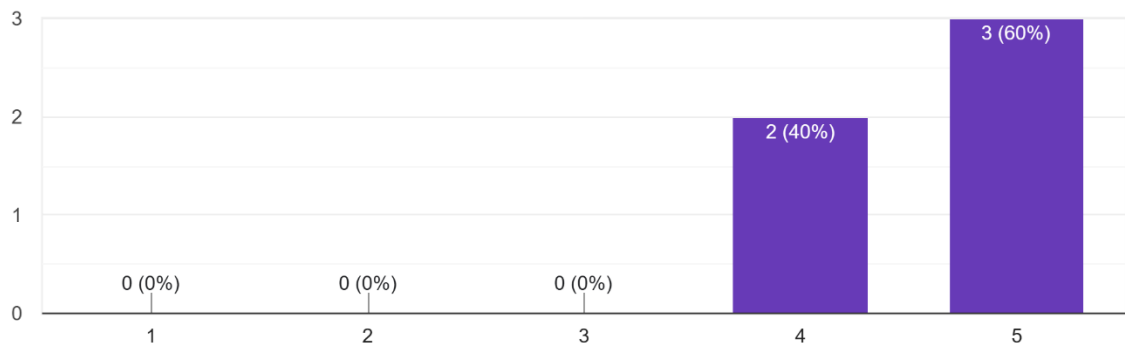
6. Was it easy to scan or upload a product?

5 responses



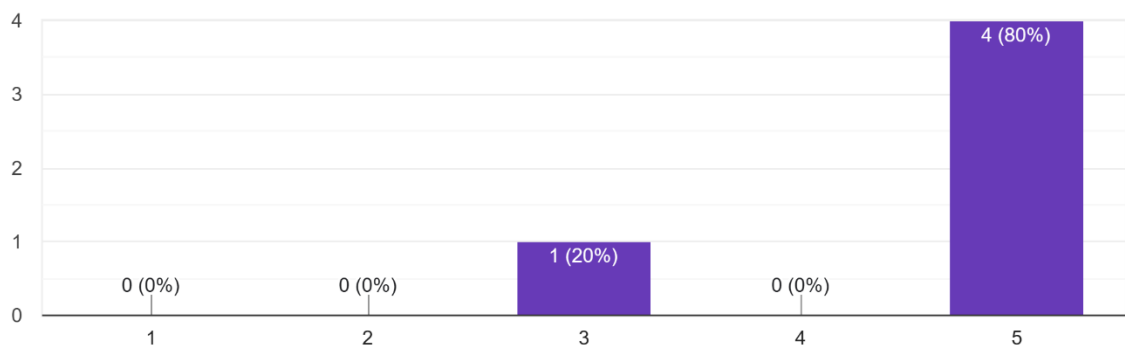
7. The analysis results were easy to understand

5 responses



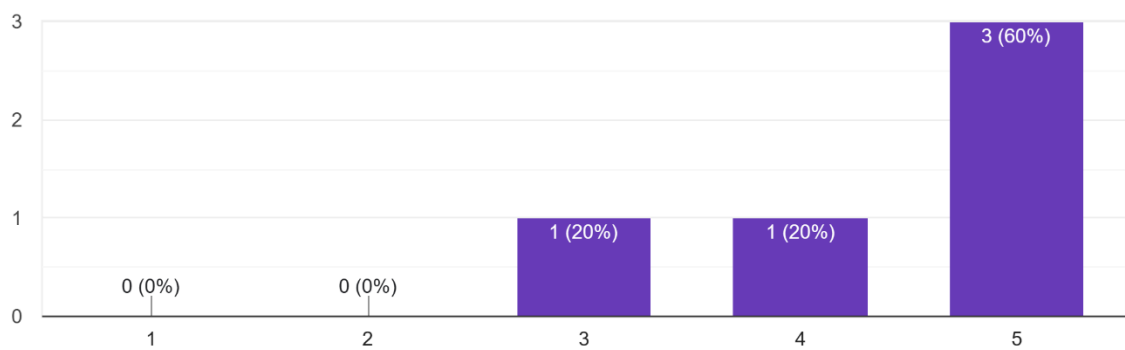
8. I trust the results provided by the app

5 responses



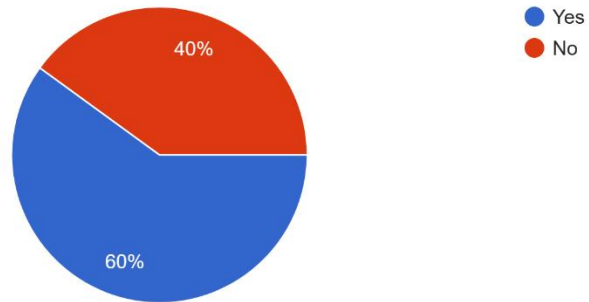
9. How would you rate the speed of the app?

5 responses



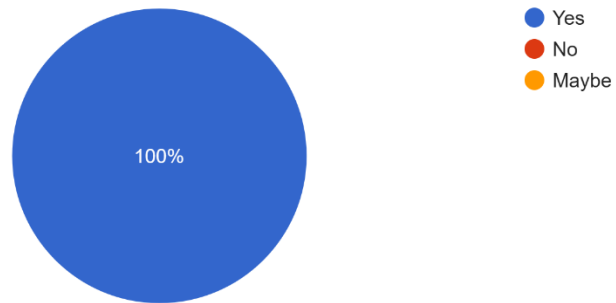
10. Did you encounter any errors?

5 responses



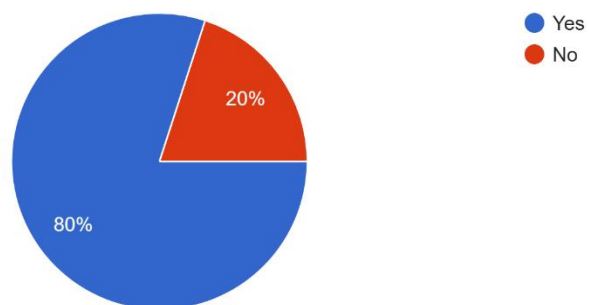
11. Do you think this app would be useful in real life?

5 responses



12. Would you use this app again?

5 responses



13. What did you like most about the app? Optional

5 responses

Clear and easy to understand, there were no questions left unanswered when viewing results of the uploads

startup loading

simple ui, nice design

Super easy to understand and navigate, I felt the flow was very natural. Styling was very visually pleasing. I thought the product analysis was so impressive! I liked the product safety badge and score, and the fact that the information included citations.

preference saving

14. What did you like least about the app? Optional

3 responses

the buttons at the bottom of an android device made some in-app buttons harder to click due to overlay design

Encountered an error upon register but was easily fixed.

inconsistent cosmetics design

15. What improvements would you suggest? Optional

4 responses

If possible to implement a search feature for items without image requirement

less sections

None, very cool app.

use a color paltte for icons

10. Permissions Table

| Feature | Permission | Admin | Moderator | User |
|--------------------|---------------------------|-------|-----------|------|
| Users | user:view-all | yes | yes | no |
| Users | user:view-own | no | no | yes |
| Users | user:create | yes | no | no |
| Users | user:update-any | yes | yes | no |
| Users | user:update-own | no | yes | yes |
| Users | user:delete-any | yes | yes | no |
| Users | user:delete-own | no | no | yes |
| Preferences | preference:view | yes | yes | yes |
| Preferences | preference:create | yes | no | no |
| Preferences | preference:update | yes | yes | no |
| Preferences | preference:delete | yes | no | no |
| Allergens | allergen:view | yes | yes | yes |
| Allergens | allergen:create | yes | no | no |
| Allergens | allergen:update | yes | yes | no |
| Allergens | allergen:delete | yes | no | no |
| Conditions | condition:view | yes | yes | yes |
| Conditions | condition:create | yes | no | no |
| Conditions | condition:update | yes | yes | no |
| Conditions | condition:delete | yes | no | no |
| Profiles | profile:view-all | yes | yes | no |
| Profiles | profile:view-own | no | no | yes |
| Profiles | profile:view-own-all | yes | yes | yes |
| Profiles | profile:create | yes | no | yes |
| Profiles | profile:update | yes | yes | yes |
| Profiles | profile:delete | yes | no | yes |
| Prompts | prompt:view | yes | yes | no |
| Prompts | prompt:create | yes | no | no |
| Prompts | prompt:update | yes | no | no |
| Prompts | prompt:delete | yes | no | no |
| Products | product:view | yes | yes | yes |
| Products | product:create | yes | yes | yes |
| Products | product:update | yes | yes | yes |
| Products | product:delete | yes | no | no |
| Evaluation Context | evaluation-context:view | yes | yes | yes |
| Evaluation Context | evaluation-context:create | yes | yes | yes |
| Evaluation Context | evaluation-context:update | yes | yes | yes |
| Evaluation Context | evaluation-context:delete | yes | no | yes |
| Admin | admin:panel-access | yes | no | no |
| Admin | role:manage | yes | no | no |
| Admin | system:settings | yes | no | no |

11. User Testing Tasks

Task 1: Register and Create Profile

| | |
|---------------------------|---|
| Research Question: | What issues arise from the registration and profile creation? |
| Scenario: | Imagine you heard about this application from a friend and decided to sign up to become a user. |
| Task: | <p>Start by registering as a user in the application (please do not use your personal information—sample details will be provided).</p> <p>Once registered, complete your profile using the provided information. Then navigate through the app as you normally would, exploring the available features and content.</p> <p>As you use the app, please verbally mention any issues, confusion, or thoughts you have.</p> <p>When you are finished, navigate to your profile and log out of the application.</p> |
| Inputs: | <p>Registration Information:</p> <p>Email: john@gmail.com</p> <p>First Name: John</p> <p>Last Name: Doe</p> <p>Password: Password123!</p> <p>Profile Information:</p> <p>First Name: John</p> <p>Last Name: Doe</p> <p>Age: 32</p> <p>Condition: Choose Random</p> <p>Preference: Choose Random</p> <p>Allergen: Choose Random</p> <p>Profile: Choose Avatar</p> |

Thank you for your participation. We value all your input.

Task 2: Analysing Process

| | |
|---------------------------|--|
| Research Question: | What issues arise when users attempt to analyse an image? |
| Scenario: | Imagine you were recommended this application from a friend or colleague, and you decided to capture a product. |
| Task: | <p>Start by logging out of the account if you are currently logged in. Once logged out, please log in using the details provided below (do not use your own personal information).</p> <p>After logging in, navigate through the app as you normally would. Locate the scan or upload feature and capture or upload a product image using the provided example.</p> <p>Allow the app to process the image and generate the ingredient extraction and analysis. Review the results and take note of any warnings or recommendations shown.</p> <p>As you complete this task, please verbally mention any issues, confusion, or thoughts you have.</p> <p>Once finished, log out of the application.</p> |
| Inputs: | <p>Login Information:</p> <p>Email: StephanieJoane@example.com</p> <p>Password: MyPassword321!</p> |

Thank you for your participation. We value all your input.

Task 3: Analysing and Viewing History

| | |
|---------------------------|---|
| Research Question: | Are there any issues with viewing history after an analysis. |
| Scenario: | <p>You've just picked up a new skincare product and want to check if it's safe to use. Use the app as a new user to scan or upload the product image and view the analysis results.</p> <p>After reviewing the result, go to the history section and find your previous scan.</p> <p>Mention anything that is confusing or unclear.</p> |
| Task: | <p>Confirm you are logged out. From there, log in using the details provided below (do not use your own personal information). Once logged in, navigate through the app and locate the scan feature.</p> <p>Capture or upload a product image and allow the app to process and display the analysis results. Review the outcome shown on the screen.</p> <p>From there, navigate to the history section and locate the scan you just completed.</p> <p>Please verbally state if you come across any issue(s). Once satisfied, proceed to log out.</p> |
| Inputs: | <p>Registration Information:</p> <p>Login Information:</p> <p>Email: StephanieJoane@example.com</p> <p>Password: MyPassword321!</p> |

Thank you for your participation. We value all your input.

Task 4: Re-Evaluation of History

| | |
|---------------------------|---|
| Research Question: | What issues arise if the user would like to re-evaluate a previous analysis? |
| Scenario: | You have updated your current allergen list and would like to re-analyse previously 'safe' products to determine whether they remain 'safe' to use. |
| Task: | <p>Confirm you are logged into the application. Navigate to your profile and update your allergens using the provided information.</p> <p>Once updated, go to the history section, locate the most recently analysed product, and find the re-analyse banner. Re-analyse the product and review the updated results.</p> <p>Please verbally state if you come across any issue(s) or notice any differences in the analysis. Once satisfied, proceed to log out.</p> |
| Inputs: | <p>Login Information:</p> <p>Email: StephanieJoane@example.com</p> <p>Password: MyPassword321!</p> <p>Allergen Update Information:</p> <p>Allergen: Remove Random and Choose Random</p> |

Thank you for your participation. We value all your input.

Task 5: Adding Profile and Analysing

| | |
|---------------------------|---|
| Research Question: | What issues arise with creating additional Profiles |
| Scenario: | You have been using the application for some time and now want to create an additional profile for a friend, so you can scan and analyse products on their behalf safely. |
| Task: | <p>Confirm you are logged into the application. Navigate to your profile and create a new profile for your friend using the provided information.</p> <p>Once created, switch to the new profile and use the scan feature to capture or upload a product image. Select both profiles for scanning. Allow the app to analyse the product and display the results. Using the switch profile view results per profile.</p> <p>Please verbally state if you come across any issue(s). Once satisfied, proceed to log out.</p> |
| Inputs: | <p>Login Information:</p> <p>Email: StephanieJoane@example.com</p> <p>Password: MyPassword321!</p> <p>Profile Information:</p> <p>First Name: Amy</p> <p>Last Name: Doe</p> <p>Age: (Leave Blank)</p> <p>Condition: Choose Random</p> <p>Preference: Choose Random</p> <p>Allergen: Choose Random</p> <p>Profile: Choose Avatar</p> |

Thank you for your participation. We value all your input

12. All Consent Forms

-Matty

Project Title: *Lumière – Cosmetic Ingredient Analysis App*

Principal Investigators: Laura 'Lili' Hofmanova

You are invited to participate in a user test of *Lumière*, a mobile application designed to identify potentially harmful cosmetic ingredients for individuals with specific skin conditions. *Lumière* promotes transparent analysis of cosmetic ingredients and their effects on individuals. The purpose of this test is to gather feedback on the app's usability, features, and overall user experience. Your participation will involve using the application and sharing your thoughts throughout the process, which will be recorded on video. This form outlines the terms and conditions of your involvement in this testing phase.

Participant Information:

- **Participant Name:** Matthew Dent

- **Date of Birth** (*DD:MM:YYYY*): 16/08/2003 **Age:** 22

- **Nationality:** Irish

- **Gender** (mark 'X'):
 - Female**
 - X Male**
 - Non-Binary**
 - Prefer Not to Say**

- **Contact Information** (*optional*): N00220082@iadt.ie

Consent to Participate:

I, **Matthew Dent** voluntarily agree to participate in the user test for the beauty app stated above. I understand that my participation is entirely voluntary, and I have the right to withdraw at any time without penalty.

Purpose and Procedure:

I understand that the purpose of this user test is to evaluate the usability and effectiveness of the **Lumière mobile application**.

The procedure will involve:

- **Using the app under observation**
- **Providing feedback on the app's features, design, and functionality**
- **Allowing the session to be recorded on video for analysis purposes**

Confidentiality and Data Usage:

I understand that any information collected during this user test, including video recordings, will be kept confidential. My personal information will not be shared with any third parties and will only be used for the purpose of this user test.

Rights of Participants:

I understand that I have the right to:

- **Refuse to answer any questions or perform any tasks that I am uncomfortable with**
- **Withdraw from the user test at any time without penalty**
- **Request that any personal data collected during the test be deleted**

Use of Recorded Material:

I understand that video recordings of the user test sessions may be used for analysis, research, or promotional purposes related to the sustainable app. However, my identity will be kept confidential, and my personal information will not be disclosed without my explicit consent.

Contact Information:

If I have any questions or concerns about this user test or my participation in it, I can contact at N00222003@iadt.ie.

By signing below, I acknowledge that I have read and understood the terms and conditions outlined in this consent form, and I agree to participate in the user test under these conditions.

Participant's Signature: MDent

Date (DD:MM:YYYY):18/04/2026

CONTINUE ON THE NEXT PAGE FOR RECORDING CONSENT.

Recording Consent Form

Thank you for participating in our usability research!

We'll be recording your session so it can be reviewed to better understand your experience and improve the app.

Please read the statement below and sign where indicated.

Your insights help us improve the experience for individuals managing skin conditions and making informed cosmetic choices.

I understand that my usability test session will be recorded. I grant Lumière research team permission to use this recording for internal use only, for the purpose of improving the designs being tested.

Please indicate your consent by ticking the appropriate options below:

Video Recording

Signature: MDent

Print your name: MATTHEW DENT

Date (DD:MM:YYYY): 18/04/2026

|

Project Title: *Lumière* – Cosmetic Ingredient Analysis App

Principal Investigators: Laura 'Lili' Hofmanova

You are invited to participate in a user test of *Lumière*, a mobile application designed to identify potentially harmful cosmetic ingredients for individuals with specific skin conditions. *Lumière* promotes transparent analysis of cosmetic ingredients and their effects on individuals. The purpose of this test is to gather feedback on the app's usability, features, and overall user experience. Your participation will involve using the application and sharing your thoughts throughout the process, which will be recorded on video. This form outlines the terms and conditions of your involvement in this testing phase.

Participant Information:

• Participant Name: Isabel Ripoll

• Date of Birth (DD:MM:YYYY): 02 / 02 / 1977 Age: 49

• Nationality: Colombian

• Gender (mark 'X'):

- Female
- Male
- Non-Binary
- Prefer Not to Say

• Contact Information (optional): _____

Consent to Participate:

I, [Participant's Full Name], voluntarily agree to participate in the user test for the beauty app stated above. I understand that my participation is entirely voluntary, and I have the right to withdraw at any time without penalty.

Purpose and Procedure:

I understand that the purpose of this user test is to evaluate the usability and effectiveness of the **Lumière mobile application**.

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- **Providing feedback on the app's features, design, and functionality**
- **Allowing the session to be recorded on video for analysis purposes**

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Rights of Participants:

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- **Withdraw from the user test at any time without penalty**
- **Request that any personal data collected during the test be deleted**

Use of Recorded Material:

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Contact Information:

If I have any questions or concerns about this user test or my participation in it, I can contact at N00222003@iadt.ie.

By signing below, I acknowledge that I have read and understood the terms and conditions outlined in this consent form, and I agree to participate in the user test under these conditions.

Participant's Signature: Isabel Ripoll

Date (DD:MM:YYYY): 02 / 02 / 1977

CONTINUE ON THE NEXT PAGE FOR RECORDING CONSENT.

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I understand that my usability test session will be recorded. I grant *Lumière* research team permission to use this recording for internal use only, for the purpose of improving the designs being tested.

Please indicate your consent by ticking the appropriate options below:

Voice Recording

Video Recording

Signature: _____

Print your name: _____

Date (DD:MM:YYYY): _____

Isobel Ripoll
ISOBELL RIPOLL
02 / 02 / 1977

Project Title: *Lumière* – Cosmetic Ingredient Analysis App

Principal Investigators: Laura 'Lili' Hofmanova

You are invited to participate in a user test of *Lumière*, a mobile application designed to identify potentially harmful cosmetic ingredients for individuals with specific skin conditions. *Lumière* promotes transparent analysis of cosmetic ingredients and their effects on individuals. The purpose of this test is to gather feedback on the app's usability, features, and overall user experience. Your participation will involve using the application and sharing your thoughts throughout the process, which will be recorded on video. This form outlines the terms and conditions of your involvement in this testing phase.

Participant Information:

- Participant Name: EDVARDAS LIPIUKAS

- Date of Birth (DD:MM:YYYY): 18, 12, 2001 Age: 24

- Nationality: Lithuanian

- Gender (mark 'X'):
 - Female
 - Male
 - Non-Binary
 - Prefer Not to Say

- Contact Information (optional): _____

Consent to Participate:

I, [EDVARDAS Name], voluntarily agree to participate in the user test for the beauty app stated above. I understand that my participation is entirely voluntary, and I have the right to withdraw at any time without penalty.

Purpose and Procedure:

I understand that the purpose of this user test is to evaluate the usability and effectiveness of the **Lumière mobile application**.

The procedure will involve:

- **Using the app under observation**
- **Providing feedback on the app's features, design, and functionality**
- **Allowing the session to be recorded on video for analysis purposes**

Confidentiality and Data Usage:

I understand that any information collected during this user test, including video recordings, will be kept confidential. My personal information will not be shared with any third parties and will only be used for the purpose of this user test.

Rights of Participants:

I understand that I have the right to:

- **Refuse to answer any questions or perform any tasks that I am uncomfortable with**
- **Withdraw from the user test at any time without penalty**
- **Request that any personal data collected during the test be deleted**

Use of Recorded Material:

I understand that video recordings of the user test sessions may be used for analysis, research, or promotional purposes related to the sustainable app. However, my identity will be kept confidential, and my personal information will not be disclosed without my explicit consent.

Contact Information:

If I have any questions or concerns about this user test or my participation in it, I can contact at N00222003@iadt.ie.

By signing below, I acknowledge that I have read and understood the terms and conditions outlined in this consent form, and I agree to participate in the user test under these conditions.

Participant's Signature: _____ 

Date (DD:MM:YYYY): 19 / 04 / 2026

CONTINUE ON THE NEXT PAGE FOR RECORDING CONSENT.

Recording Consent Form

Thank you for participating in our usability research!

We'll be recording your session so it can be reviewed to better understand your experience and improve the app.

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I understand that my usability test session will be recorded. I grant *Lumière* research team permission to use this recording for internal use only, for the purpose of improving the designs being tested.

Please indicate your consent by ticking the appropriate options below:

Voice Recording

Video Recording

Signature: _____

Print your name: EOVAROAS

Date (DD:MM:YYYY): 21/04/2026

Project Title: *Lumière* – Cosmetic Ingredient Analysis App

Principal Investigators: Laura 'Lili' Hofmanova

You are invited to participate in a user test of *Lumière*, a mobile application designed to identify potentially harmful cosmetic ingredients for individuals with specific skin conditions. *Lumière* promotes transparent analysis of cosmetic ingredients and their effects on individuals. The purpose of this test is to gather feedback on the app's usability, features, and overall user experience. Your participation will involve using the application and sharing your thoughts throughout the process, which will be recorded on video. This form outlines the terms and conditions of your involvement in this testing phase.

Participant Information:

• **Participant Name:** Angelina Morris

• **Date of Birth (DD:MM:YYYY):** 02, 11, 2003 **Age:** 22

• **Nationality:** Irish

• **Gender (mark 'X'):**



Female



Male



Non-Binary



Prefer Not to Say

• **Contact Information (optional):** _____

Consent to Participate:

I, Angelina Morris, voluntarily agree to participate in the user test for the beauty app stated above. I understand that my participation is entirely voluntary, and I have the right to withdraw at any time without penalty.

Purpose and Procedure:

I understand that the purpose of this user test is to evaluate the usability and effectiveness of the **Lumière mobile application**.

The procedure will involve:

- **Using the app under observation**
- **Providing feedback on the app's features, design, and functionality**
- **Allowing the session to be recorded on video for analysis purposes**

Confidentiality and Data Usage:

I understand that any information collected during this user test, including video recordings, will be kept confidential. My personal information will not be shared with any third parties and will only be used for the purpose of this user test.

Rights of Participants:

I understand that I have the right to:

- **Refuse to answer any questions or perform any tasks that I am uncomfortable with**
- **Withdraw from the user test at any time without penalty**
- **Request that any personal data collected during the test be deleted**

Use of Recorded Material:

I understand that video recordings of the user test sessions may be used for analysis, research, or promotional purposes related to the sustainable app. However, my identity will be kept confidential, and my personal information will not be disclosed without my explicit consent.

Contact Information:

If I have any questions or concerns about this user test or my participation in it, I can contact at N00222003@iadt.ie.

By signing below, I acknowledge that I have read and understood the terms and conditions outlined in this consent form, and I agree to participate in the user test under these conditions.

Participant's Signature: Angelina Morris

Date (DD:MM:YYYY): 21, 04, 2026

CONTINUE ON THE NEXT PAGE FOR RECORDING CONSENT.

Recording Consent Form

Thank you for participating in our usability research!

We'll be recording your session so it can be reviewed to better understand your experience and improve the app.

Please read the statement below and sign where indicated.

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I understand that my usability test session will be recorded. I grant *Lumière* research team permission to use this recording for internal use only, for the purpose of improving the designs being tested.

Please indicate your consent by ticking the appropriate options below:

Voice Recording

Video Recording

Signature: Angelina Morris

Print your name: ANGELINA MORRIS

Date (DD:MM:YYYY): 21, 04, 2026

Project Title: *Lumière* – Cosmetic Ingredient Analysis App

Principal Investigators: Laura 'Lili' Hofmanova

You are invited to participate in a user test of *Lumière*, a mobile application designed to identify potentially harmful cosmetic ingredients for individuals with specific skin conditions. *Lumière* promotes transparent analysis of cosmetic ingredients and their effects on individuals. The purpose of this test is to gather feedback on the app's usability, features, and overall user experience. Your participation will involve using the application and sharing your thoughts throughout the process, which will be recorded on video. This form outlines the terms and conditions of your involvement in this testing phase.

Participant Information:

• Participant Name: George Diffley

• Date of Birth (DD:MM:YYYY): 22/08/2005 Age: 20

• Nationality: IRISH

• Gender (mark 'X'):

Female

Male

Non-Binary

Prefer Not to Say

• Contact Information (optional): georgediffley05@gmail.com

Consent to Participate:

I, [GEORGE DIFFLEY], voluntarily agree to participate in the user test for the beauty app stated above. I understand that my participation is entirely voluntary, and I have the right to withdraw at any time without penalty.

Purpose and Procedure:

I understand that the purpose of this user test is to evaluate the usability and effectiveness of the **Lumière mobile application**.

The procedure will involve:

- **Using the app under observation**
- **Providing feedback on the app's features, design, and functionality**
- **Allowing the session to be recorded on video for analysis purposes**

Confidentiality and Data Usage:

I understand that any information collected during this user test, including video recordings, will be kept confidential. My personal information will not be shared with any third parties and will only be used for the purpose of this user test.

Rights of Participants:

I understand that I have the right to:

- **Refuse to answer any questions or perform any tasks that I am uncomfortable with**
- **Withdraw from the user test at any time without penalty**
- **Request that any personal data collected during the test be deleted**

Use of Recorded Material:

I understand that video recordings of the user test sessions may be used for analysis, research, or promotional purposes related to the sustainable app. However, my identity will be kept confidential, and my personal information will not be disclosed without my explicit consent.

Contact Information:

If I have any questions or concerns about this user test or my participation in it, I can contact at N00222003@iadt.ie.

By signing below, I acknowledge that I have read and understood the terms and conditions outlined in this consent form, and I agree to participate in the user test under these conditions.

Participant's Signature: George Duffley

Date (DD:MM:YYYY): 25 / 04 / 2026

CONTINUE ON THE NEXT PAGE FOR RECORDING CONSENT.

Recording Consent Form

Thank you for participating in our usability research!

We'll be recording your session so it can be reviewed to better understand your experience and improve the app.

Please read the statement below and sign where indicated.

Your insights help us improve the experience for individuals managing skin conditions and making informed cosmetic choices.

I understand that my usability test session will be recorded. I grant *Lumière* research team permission to use this recording for internal use only, for the purpose of improving the designs being tested.

Please indicate your consent by ticking the appropriate options below:

- Voice Recording
- Video Recording

Signature: George Diffley

Print your name: GEORGE DIFFLEY

Date (DD:MM:YYYY): 28/04/2026

13. Transcripts (Isobel, Edvardas)

Isobel 0:06

Ohh, Jesus Christ!

The.

Prod second, I will turn my mic off.

Okay, task three, analysing and viewing history. Oh, that's already okay.

Logging in.

Look in.

L.

Okay, once logged in, navigate through the app and locate the scan feature, which I think is just this big button. Camera access needed. Yes, grant permission, allow.

Okay, capture, upload a product dimension, allow the app to process, display the analysis result, read the outcome shown on the screen. Okay, here is the product I want to test.

Okay, and product found, confirm the product for continuing. Yes, this, is it? Yes, it is.

Oh, it was, yes.

Yes.

Yeah.

Avoid? Okay, why am I avoiding it?

Okay.

preservatives, skin sensitizers, and can cause allergic contact dermatitis.

Cause that per skin reactions in individual sensitive skin, but it's not like that is cruel if you're vegan.

They matched profile settings, and...

Okay.

Okay, one now.

Navigate to the history section and locate the scan you just completed.

The big button for history.

And this is the scam.

Okay, I can see all of the information again.

Can go back, that's nice.

Please replace it if you come across any issues. Okay, no issues found.

And I should log out.

Okay.

Okay, task for re-evaluation of history.

Confirm you are logged into the application. Okay, I'm not, so I will log in.

Login.

Okay, nice. But now...

Navigate to your profile and update your allergens using the provided information.

Profile.

Other gents.

Whichever the tester would like.

Okay, let's see. I'm allergic to...

Let's say...

This one?

This one, maybe.

Let's see.

Updated, go to the history section and locate previously analysed product marked as caution.

Or make like.

History section.

All wait.

Yeah.

History.

This is a void.

OK, reanalyze the product and review the updated results.

Here, we evaluate.

OK, now it's still a void.

Ten out of 100.

By this result, because the nice.

Yep, so no issues found. Everything is nice and...

Easy to navigate.

● **Laura Hofmanova (Student)** stopped transcription

Edvardas Liakus 0:24

Shake the ****.

I already have an account, so I am going to log in.

Ohh.

Must have misspelt it.

OK.

So, I want to create a profile for my friend.

Amy Toyle.

Okay, cheque her condition.

It's acne.

And she does, I think, have a L.

She does have a preference for vegan products.

And then we're gonna save a picture, and then...

We go with the save.

Continue.

And then we switch into her.

And then we're gonna look for a scan.

So gonna scan.

Let's scan this.

Just, ohh, I need it.

That was quite quick.

Let's continue and select both of our profiles.

And see that analyzation.

Okay, just gonna read through. It does say caution for the product, so...

Prod it does look legit, but it comes to analysis that...

not as safe as you would think so.

That's interesting.

OK, that's.

Useful information.

So, I come to log out.

Oh.

I'm just gonna look at this.

Settings and I log out.



Laura Hofmanova (Student) stopped transcription

14. Download Script

Lumiere Client Application

This is the mobile client for Lumiere, developed using Expo (React Native). The application enables users to scan cosmetic products, analyse ingredients, and manage personalised skincare insights.

1. Getting Started

Follow the steps below to run the application locally using Visual Studio Code and a mobile device.

2. Prerequisites

Ensure the following are installed:

- Node.js (version 18 or higher recommended)
- npm (version 9 or higher)
- Visual Studio Code
- Expo Go on your mobile device

To install Expo Go on your phone:

- Open the App Store (iPhone) or Google Play Store (Android)
- Search for "Expo Go"
- Download and install the application

Note:

You do not need to create an account to use Expo Go. If prompted to sign in, you may skip this step.

3. Installation

Open Visual Studio Code and use the terminal to clone the repository and install dependencies:

- `git clone https://github.com/lchka/lumiere.git`
- `cd lumiere/client`
- `npm install`

4. Environment Configuration

Uncomment the a .env file inside the /client directory.

This ensures the application connects to the hosted backend.

5. Running the Application

In the VS Code terminal, start the development server:

```
npx expo start
```

A QR code will appear in the terminal or browser.

6. Running on Your Phone

1. Open the Expo Go application on your phone
2. Select the option to scan a QR code
3. Scan the QR code shown in your terminal or browser
4. The application will open automatically on your device

Ensure your phone and computer are connected to the same WiFi network.

7. API Configuration

The application connects to a backend server.

The backend is hosted on Render:

<https://majorproject-1toi.onrender.com/>

Important notes:

- The hosted server may go to sleep after a period of inactivity (approximately 15 minutes)
- Before testing, open the link above in a browser to reactivate the server
- Initial requests may take longer while the server is waking up

If running locally, update the API URL in:

```
/client/src/config/api.ts
```

Example:

```
export const API_URL = "http://YOUR_IP:3000";
```

Additional notes:

- Do not use localhost, as it will not work on a mobile device
- Use your computer's local IP address (for example, <http://192.168.1.10:3000>)
- Ensure the backend server is running before testing

8. Troubleshooting

Application does not load on phone

- Ensure your phone and computer are connected to the same WiFi network
- Restart the Expo server:

```
npx expo start -c
```

Dependency issues

rm -rf node_modules

npm install

Camera or permissions issues

- Ensure camera permissions are enabled on your device
- Restart Expo Go if permissions were recently granted

15. RAG Papers Used

- A daily regimen of a ceramide-dominant moisturising cream and cleanser restores the skin permeability barrier in adults with moderate eczema - <https://onlinelibrary.wiley.com/doi/epdf/10.1111/dth.14970>
- A review on the role of moisturizers for atopic dermatitis - <https://synapse.koreamed.org/upload/synapsedata/pdfdata/0253apa/apa-6-120.pdf>
- Effects of tocotrienol on aging skin: A systematic review - <https://www.frontiersin.org/journals/pharmacology/articles/10.3389/fphar.2022.1006198/full>
- Epidermal Barrier Dysfunction in Atopic Dermatitis - <https://revista.spdv.com.pt/index.php/spdv/article/view/1405>
- Lipid-based formulations in cosmeceuticals and biopharmaceuticals - <https://link.springer.com/content/pdf/10.1186/s41702-020-00062-9.pdf>
- Protective effects of cosmetic ingredients - <https://link.springer.com/content/pdf/10.1007/s11033-021-06918-5.pdf>
- The Role of Moisturizers in Addressing Various Kinds of Dermatitis: A Review - https://www.clinmedres.org/content/15/3-4/75?utm_campaign=DSL_clinique-smart-night-custom-repair-feuchtigkeitsscreme-bewertungen
- Role of Topical Emollients and Moisturizers in the Treatment of Dry Skin Barrier Disorders - <https://link.springer.com/article/10.2165/00128071-200304110-00005>
- Safety Assessment of Palm-Derived Ingredients as Used in Cosmetics - <https://journals.sagepub.com/doi/full/10.1177/10915818241237797>
- Study of the protective effects of cosmetic ingredients on the skin barrier, based on the expression of barrier-related genes and cytokines - <https://link.springer.com/article/10.1007/s11033-021-06918-5>
- The Effect of Ceramide-Containing - <https://cdn.mdedge.com/files/s3fs-public/Document/September-2017/081010087.pdf>
- The Enigma of Bioactivity and Toxicity of Botanical Oils for Skin Care - <https://www.frontiersin.org/journals/pharmacology/articles/10.3389/fphar.2020.00785/full>

16. Links to Hosted Server and Hosted Admin Panel

Note: The server is hosted on Render's free tier and may experience occasional downtime due to inactivity.

Server: <https://majorproject-1toi.onrender.com>

Admin Panel: <https://majorproject-1-73tu.onrender.com>

Admin Login Details:

Email: admin@example.com

Password: Admin123!

17. Jest and SuperTest Tests

Integration

| Module | Method | Endpoint | Status | Expected Result |
|----------|--------|-----------------------------------|--------|---------------------------|
| Allergen | POST | /api/allergens | 401 | Unauthenticated |
| Allergen | POST | /api/allergens | 403 | No permission |
| Allergen | POST | /api/allergens | 400 | Invalid body |
| Allergen | POST | /api/allergens | 201 | Creates allergen |
| Allergen | GET | /api/allergens | 200 | Returns all |
| Allergen | GET | /api/allergens/:id | 200 | Returns allergen |
| Allergen | GET | /api/allergens/:id | 404 | Not found |
| Allergen | PATCH | /api/allergens/:id | 200 | Updates |
| Allergen | PATCH | /api/allergens/:id | 404 | Not found |
| Allergen | DELETE | /api/allergens/:id | 200 | Deletes |
| Allergen | DELETE | /api/allergens/:id | 404 | Not found |
| Allergen | GET | /api/allergens/profile/:profileId | 200 | Returns profile allergens |
| Allergen | GET | /api/allergens/profile/:profileId | 404 | Not found |
| Auth | POST | /api/auth/register | 201 | Registers user |
| Auth | POST | /api/auth/login | 200 | Logs in |
| Auth | POST | /api/auth/google | 200 | Google login |
| Auth | POST | /api/auth/logout | 200 | Logout |
| Auth | GET | /api/auth/me | 200 | Returns user |
| Auth | GET | /api/auth/me | 401 | Unauthenticated |
| Prompt | POST | /api/prompts | 201 | Creates prompt |
| Prompt | GET | /api/prompts | 200 | Returns all |
| Prompt | GET | /api/prompts/:id | 200 | Returns prompt |
| Prompt | GET | /api/prompts/:id | 404 | Not found |

| Module | Method | Endpoint | Status | Expected Result |
|--------|--------|------------------------|--------|----------------------|
| Prompt | PATCH | /api/prompts/:id | 200 | Updates |
| Prompt | DELETE | /api/prompts/:id | 200 | Deletes |
| User | GET | /api/users/me | 200 | Returns current user |
| User | GET | /api/users | 200 | Returns all |
| User | GET | /api/users/:id | 200 | Returns user |
| User | GET | /api/users/:id | 404 | Not found |
| User | PATCH | /api/users/:id | 200 | Updates |
| User | DELETE | /api/users/:id | 200 | Soft deletes |
| User | DELETE | /api/users/force/:id | 200 | Permanently deletes |
| User | PATCH | /api/users/restore/:id | 200 | Restores the user |

- Unit

| Module | Test Cases / Assertions |
|--------------------|---|
| Allergen | Create allergen successfully · Get all · Get by ID · Update · Delete |
| Allergen | Get allergens for profile · Validate input · Reject invalid update |
| Allergen | RBAC: Allow admin · Forbid normal user |
| Auth | Register successfully (token) · Fail if role not found |
| Auth | Login successfully (token) · Fail with invalid credentials |
| Auth | Verify token · Throw error for invalid token · Logout success |
| Auth | Validate register input · Reject invalid login input |
| Condition | Create successfully · Get all · Get by ID · Update · Delete · Profile fetch |
| Condition | Validate input · Reject invalid update · RBAC: Admin vs User |
| Evaluation Context | Create · Evaluate product · Admin: Get all |
| Evaluation Context | Get by ID · Profile · Product · User |

| Module | Test Cases / Assertions |
|--------------------|--|
| Evaluation Context | Update · Re-evaluate · Delete · Validate & Reject inputs |
| Evaluation Context | RBAC: User / Mod / Admin permissions |
| Gemini / AI | Extract product from image · Fallback to ingredients-only · Web fallback |
| Gemini / AI | Error handling (missing file) · Evaluate & Normalize result |
| Preference | Create · Get all · Get by ID · Update · Delete · Profile fetch |
| Preference | Validate input · Reject invalid update · RBAC: Admin vs User |
| Product | Create · Get all (Admin) · Get by ID (Ownership) |
| Product | Update & Delete (with ownership) · Validate input · Empty update |
| Product | RBAC: User / Mod / Admin · Forbid unauthorized delete |
| Profile | Create · Get all · Get by ID · Get by User ID · Current Profile |
| Profile | Update · Delete · Validate input · Empty update |
| Profile | RBAC: User / Mod / Admin · Forbid restricted actions |
| Prompt | Create · Get all · Get by ID · Update · Delete |
| Prompt | Validate input · Empty update · RBAC: Admin only |
| User | Get current · Get all · Get by ID · Update by ID · Update own |
| User | Soft delete · Force delete · Restore user |
| User | RBAC: Admin or Self · Deny other modifications · Validate input |
| Weather / UV | Get UV index (valid coords) · Error handling (invalid coords) |
| Weather / UV | Handle service failure via next() |

Youtube video link to testing : <https://youtu.be/qWYlt5NM3eU>