User Testing Report

Intelligrain - Capstone 2024

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Introduction

User testing serves as an important tool when looking for valuable insights into the usability, functionality, and overall user experience of our mobile application. Because this application will be used by farmers and not completely forgotten, our approach to testing had to be diverse and provide informative results to ensure an effective product. The primary demographic for the application is commercial farmers with combine drivers as our carryover customers. Due to the season, we were unable to secure meetings with strictly combine drivers. However, the farmers who participated in our user tests have also had experience driving combines so we decided this would be sufficient. Since our users' technological expertise varies with each individual, we employed an array of testing techniques to gain as much insight into our application as possible.

This report provides an overview of our testing plan and results obtained through the employment of various testing methodologies. This report aims to enhance the usability, functionality, and overall user experience by gaining insights from farmers and using those insights to adapt our app to be centred around the needs of our users.

Testing methodology

Background Information Gathering

We began the user testing process by conducting a roundtable discussion with farmers to gather background information and insights. Structured questions allowed the users to provide specific answers that assisted us in defining the scope and requirements of the project. The questions were targeted at understanding their current processes so we could better understand the problems they face.

Remote user testing

Due to the busy schedules and remoteness of the farmers we worked with, we started our one-on-one testing by conducting remote, moderated user testing. For this method, we began by informing our tester that we would be their hands and they would guide us.

Essentially, we screen-shared our mobile app and let the users explore it for themselves in a structured way where any time they wanted to click on something, they would tell us what they wanted to click on and what they expected to happen. We also instructed them to tell us what they liked and did not like at each step. The objective of this testing method was to keep things very structured and ensure the user was narrating their thoughts in a think-aloud fashion. The purpose of this method was to control the situation so that we could gain insights into the product from a fresh perspective.

Think-aloud testing

Following the remote user testing sessions, a subsequent meeting was arranged with one of the available farmers to gather further feedback on our latest iteration of the product. This method allowed the user to verbalize their thoughts and impressions when interacting with the app, which provided us with the feedback we needed to ensure the direction of our project was on track.

Guided user testing

The final phase of user testing with farmers involved guided user tests, where participants were given specific tasks to complete within our app. A screen recording was taken for each of the four participants (2 farmers and 2 members of Ground Truth Agriculture) to review at a later time for a more precise analysis of their interactions. The micro interactions found during the recording allowed us to see how users might use the app and gain insights into why something may not have been obvious or the expected behaviour. Any failed tasks allowed us to improve the usability of our application by making necessary changes.

Guerilla testing

Due to the lack of diversity among our test users regarding technical ability, we decided to employ guerrilla testing to mitigate the risk of technical bias. This method focused on finding people who do not represent our users to test our app’s usability. The purpose of this method of testing was to focus on the usability of the application and to ensure we had proper signifiers where necessary. The testing from this method helped us understand a more complete range of

experiences regarding mobile application interaction and how we can improve to allow any type of user to easily use our app.

Participants

The user testing participants' profile is listed below to assist in determining any bias that may be prevalent and provide background information on the users.

- Brady:
    - Role: Farmer
    - Technology expertise: very high
    - Testing methods: background information interview, remote testing, guided user testing
- Kim:
    - Role: Farmer; VP of commercial development at Ground Truth Agriculture
    - Technology expertise: high
    - Testing methods: background information interview, remote testing, think-aloud testing
- Ryley:
    - Role: Farmer
    - Technology expertise: average
    - Testing methods: background information interview, remote testing, guided user testing
- Divyesh:
    - Role: COO at Ground Truth Agriculture
    - Technology expertise: high
    - Testing methods: guided user testing
- Kyle:
    - Role: CEO at Ground Truth Agriculture
    - Technology expertise: very high
    - Testing methods: guided user testing
- Brenda
    - Technology expertise: average
    - Testing methods: Guerilla

- Clayton
    - Technology expertise: average
    - Testing methods: Guerilla
- Carolyn
    - Technology: low
    - Testing methods: Guerilla
- Zoe
    - Technology expertise: average
    - Testing methods: Guerilla
- Alex
    - Technology expertise: low
    - Testing methods: Guerilla

Timeline

The timeline of our user testing spanned seven months. The breakdown of this timeline is shown below.

- October 29, 2023
    - Farmer round table discussion with Kim, Brady, and Ryley
- January 18, 2024
    - Remote user testing with Kim
- Feb 26
    - Think-aloud testing with Kim
- March 7
    - Remote user testing with Brady and Ryley
- March 26
    - Guided user testing with Brady, Ryley, Divyesh, and Kyle
- March 27-April 1
    - Guerilla testing

Test Scenarios and Tasks

For guided user testing with guerilla testing, the tasks aimed to simulate how a farmer would use the app in a real-world setting. These methods aimed to test usability and to identify

areas of our app that needed refinement. For Guerilla testing, 3-4 of the following tests were conducted to respect the participant's limited time as we did not offer any type of reward for participation as the description of the method may imply. For guided user testing with Farmers and Ground Truth Agriculture stakeholders, we tasked users with completing all listed tasks from the perspective of a farm admin:

- You want to invite one of your combine drivers to your organization.
- You want to see what grade factors are causing your field to be red.
- You want to filter your field to only see samples with grade 2 mildew in it.
- You want to deactivate Jane Smith from your organization.
- You want to update your email
- You are an admin looking at a Grade 3 sample. You want to know what the relevant grade factors are and what the grade factor definition is.

Results and Recommendations

From our initial interview with farmers, we learned that knowing the grade and breakdown for a particular area in the field will allow them to answer questions regarding the yield response to a zone's nutrition plan, fertility, herbicide, and more. Their goal is not about optimizing their paths to store grain separately, although this use case is a possibility if they have enough time. Their goal is directed towards learning more about grain quality over time to improve crop health year after year. We also learned that notifications for admins and gamification for drivers were far less important than we believed them to be. We also determined exporting to a shape file was a requirement of this project so that they could overlay the map data with other data maps concerning soil, land elevation, and zones.

During our testing sessions with Kim, we identified issues with our map such as the progression lines which allowed us to pivot towards a new solution using dynamically created circles representing each sample. She emphasized that the less clicking when filtering, the better. She also gave good feedback concerning the imaging view as graphs at the time did not make sense to her. This caused us to add a background to the graph so that grade factors could more easily be determined at first glance. We also removed the relative percent of the grade factor and replaced it with the overall grade. We also added popups for the label and bar to

display threshold information of the grade factor, the definition of the grade factor, and the quality of the grade factor as both a per cent value and grade name.

During the separate remote testing sessions with Brady and Ryley, we learned that our new implementation of the map view (circle represents a sample) was very desirable even though it wasn't a standard generalized yield map. They both found the circles to be far easier to understand in that one circle represents one sample taken. This way, the data is more exact rather than generalized. Our new implementation of the graph was also easier to understand with each bar color representing the grade but the bars behind the graph did not make sense to Ryley. These bars were later replaced as the former implementation had 3 subcategories for each grade so you could see how close the grade was to the upper and lower limit. We later removed the subcategorization which Ryley found to be much easier to understand. Ryley also gave valuable feedback concerning other roles that may need access to the app like agronomists or marketers. Brady's feedback also helped cement our mapview solution as he has mentioned on numerous occasions that he "really likes the dots!" He also stated how important having stackable filters was which is what we had implemented. He also added a valuable contribution by asking us if he could mark a sample so he could reference it later. As a result, we later implemented the ability to flag a sample as we believed this to be within scope. From this meeting, we determined that we would not be proceeding with our planned map implementation of Fortune's algorithm. This allowed us to expand upon our features and dive deeper into our user's problems.

During the guided user testing, we found that the completion rate of the tasks from an overall standpoint stood at 86%. We also learned that the wording of our testing tasks mattered as we found Ryley had some issues with inviting a team member. He thought his combine operator was already a part of the organization and that he needed to invite them to be a driver rather than invite them to the team. After unsuccessfully, clicking on each of the buttons in the team member rows, he eventually clicked the top right invite icon. Ryley had expressed his confusion at the question which we believe to be fair. However, we decided to pursue this issue further in guerilla testing. The other area where all four testers failed to complete the task with ease was finding the definition of a particular grade factor. Each of the testers essentially traversed the entire map in search of it. The common denominator was that they all clicked on the grade factor label in the imaging view's graph. This is where we had the popup for the grade factor's thresholds. When clicked, the bar showed a popup that displayed the grade quality and

the grade factor definition. As a result of these findings, we decided to switch the popups. However, the lack of signifiers on these labels presents a problem where the user may not know it is a clickable item. To mitigate this, we added an information icon to the label.

Lastly, we conducted guerilla testing. After making the changes from our previous tests, we found the user completion rate of tasks increased to 88% across 5 participants. These results allowed us to find confidence in our application's usability across a more diverse range of technological skill sets as we were able to find people with less technical expertise than our farmers. We also noticed that the completion rate of finding the definition shot up to 100%. The only major issue found during this method was that 40% of participants believed they would edit their user information through the team members' page. This issue can be mitigated by adding a personal settings shortcut in the dropdown menu of the signed-in user's team member row.

Conclusion

Ultimately, our app is an app for people so ensuring the app has high understandability, usability, and presents a delightful user experience was one of the most important aspects of this project. Although there are areas to improve and iterate upon, we believe our app is not only usable but familiar to users due to the design choices we made and our foundational belief in keeping things simple.