

Evaluation Report #2:

Heuristic Evaluation

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Application: Ant Mound Mapper

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Team Stomp Cognitive Walkthrough:

<http://www.csl.mtu.edu/classes/cs4760/www/projects/s16/group5/www/files/Cognitive%20Walkthrough%20CS4760.pdf>

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ObservAnt Project:

This project enables middle/high school students, as well as all citizens interested in the geology and the forestry to provide useful information for scientists of these areas. User of ObservAnt can explore forest and record the location of any observed mound as well as its measurement and send this data to a database. He/she can also record the location of an explored area without any observed mounds. The combination of these data would equip scientists with a complete picture of geographic distribution of ant mounds.

ObservAnt Design:

- User of ObservAnt would first enter his/her name as well as teacher information; the idea is that the teacher should be able to track students work.
- Then the user enters forest type and the top four dominant types of trees; the idea is that there might be a relation between the forest type and the behavior of ants.
- Then user starts transect and goes to the second page; now user could either end the transect without submitting any information (probably no mound is found) or tap “Record an Ant Mound” to start recording information.
- In the third page user takes three photos; from mound’s surrounding, from untouched mound and from the mound without its top layer. Then the user should enter the observed mound’s dimension; these are necessary information for scientists to understand ants’ behavior.
- In the fourth page user could either start a new transect which goes back to the third page and fill another transect or finish recording which goes to the review page.
- In the review page user could double check his/her already entered information and then submit the transect and return to the home page.

UI Domain:

ObservAnt is a Mobile Data Logger application. User runs this application on his/her mobile phone or tablet to record useful information and send them to the database for further analyzes. Yet, because of the difficulties related to lack of Internet/GPS signals in a forest, the development team is required to develop a prototype based on a web technology (like HTML). This UI provides a facility for users (students or volunteers interested in science) to record and send their observations to the database. It also collects and submits information necessary for scientists to conduct their researches.

List of heuristic usability principles for the design's UI domain:

- Visibility of system status: user should receive appropriate feedback for each of his/her actions in a meaningful time, so he/she would be conducted to finish his/her task with more confident and less error tries.
- Match between system and the real world: the user interface should be simple and easy to understand for users. Its language should be familiar to the user. Especially if there is no tutorial document, user should be able to easily figure out what is the proper action for a task to be done.
- User control and freedom: If user tapped a button or met a page mistakenly, he/she should be able to leave that page (exit/cancel function) instead of pursuing to the end.
- Constancy and standards: the same buttons, icons, terms, ... should have the same meaning/action in entire the app.
- Error prevention: we should reduce any probability of errors and mistakes in the app. So we should remove actions which may cause error, provide proper information for example what is the correct input format, ask user to double check data before submission,
- Recognition rather than recall: each action should be visible enough for the user (provide proper choices, notifications, warnings) so he/she doesn't need to remember information from another part to finish the current action. Each step should be simple and easy to be done individually.
- Flexibility and efficiency of use: makes experience of using the app faster and easier. Allows users to tailor frequent actions.
- Aesthetic and minimalist design: avoid providing unnecessary/irrelevant information. Use meaningful icons instead of too many instructions.
- Help users recognize, diagnose and recover from errors: describe error situation properly/understandable, and provide solutions to correct it or cancel/return to the beginning.

- Help and documentation: provide complete (but not too large), easy to use and searchable help and documentations to guide user conveniently.

List of usability problems generated from the heuristic evaluation

1. Page 1: There are many items to be filled in one page; so easy to ignore one or some of them or enter them in error. It would be better to separate them into two pages; one for user information and the other for forest. This violates "Error prevention."
2. There is a high probability that students do not remember/enter their teacher name/email correctly. The same is true for tree types because the input boxes are not drop down. This violates "Error prevention" and "Help users recognize, diagnose and recover from errors."
3. Page 2: After completing a relatively long list in the last page, user doesn't receive any feedback from his/her work, such as "Welcome Alex!" This violates "Visibility of system status."
4. Page 2: the idea of separating "Start Transect" in page one from "Record an Ant Mound" in page two is that may user starts a transect but leaves the transect without finding any mound. In this case, as scientist mentioned, the explored location with no observed mound should be recorded as well. But this is not considered before ending transect.
5. Page 3: there are many actions to be done in page three; easy to confuse and choose items in error. For example submit a photo from environment instead of mound it. This violates "Error prevention."
6. Page 3: there is no instruction/example to express the correct type of measurement such as boundaries, min/max, This violates "Help and documentation."
7. Page 4: there is no escape; cancel/return. This violates "User control and freedom."
8. Page 4: there is no way to review and correct the entered information in the last page before starting a new transect or submit them. This violates "Error prevention" and "Help users recognize, diagnose and recover from errors."

9. Page 5: there is no way to edit the reviewed information nor to cancel and restart. This violates “User control and freedom” and “Help users recognize, diagnose and recover from errors.”
10. Page 5: the submission button is tagged “Continue” which doesn’t make sense of submission to the database for user. This violates “Match between system and the real world.”
11. Page 6: after successful submission, there is no exit way from the application. So they can only start over again. This violates “User control and freedom.”
12. Page 6: it is not necessary that after a submission and to start over again, user go back to the first page. Because his/her information obviously didn’t change in this period. This violates “Flexibility and efficiency of use.”
13. Page 1, 2, 4 and 6: the color brown is used for different actions; in page one is used to start transect, in page two is used to end transect and in page four is used for finish and review. The same is true for color green; record (page two), start a new (page four) and return (page six). Consistency. This violates “Constancy and standards.”
14. There is no help/FAQ in entire the app. This violates “Help and documentation.”
15. There is no unique identifier. So students may enter their classmate’s name and send improper photos to the teacher on behalf of him/her. This violates “Error prevention.”
16. There is no communication with user about temporary storage of data. So in the case of unexpected exit such as when the phone goes out of battery, user cannot figure out if the data is saved somewhere or not. This violates “Help users recognize, diagnose and recover from errors” and “Error prevention.”

Identification of critical usability concerns

1. Problem two is critical; it may cause either user cannot pursue to the next page (if all items in page one are mandatory and their correctness would be checked) or sending incorrect information (if correctness of entered data would not be checked).

2. Problem four is critical specifically from scientists' point of view; scientists are interested in and looking for information of locations without traces of mound. This is simply ignored in this app.
3. Problem seven and eight are critical; if user in page four figure out that he/she entered wrong information, there is no way to cancel it. So he/she should submit incorrect information.
4. Problem nine is critical; if user figure out there is an error in the entered data, instead of correcting them, he/she should submit incorrect data.
5. Problem eleven is critical; if user submit the transect and wants to exit the application, there is no way to do that. Instead, he/she should start a new transect!
6. Problem fifteen is critical; there is a probability that students enter their classmate's name and send improper photos to the teacher on behalf of him/her.

Illustrate the critical usability concerns with a short story

1. Alice (user of ObservAnt) is in the forest and wants to start the app. But she cannot remember her teacher's email address correctly. So she cannot start a transect and send data (if that field is mandatory and its correctness would be checked) or she can start transect and record information but they would be sent to an error/invalid email address.
2. Alice (user of ObservAnt) is in the forest and she is using the app. She starts a transect but after exploring the area she cannot find a mound. So she wants to exit the application. Since she cannot record information of the explored area, scientists have no idea about the explored location with no mound. This information is necessary for scientists to complete their picture of the geographic distribution of the mounds as well as the locations with no mounds.
3. Alice (user of ObservAnt) is in the forest and she is using the app. She starts a transect and she finds a mound. So she records the mound's information and goes to the page four. In the page four she figures out that she entered the dimensions in inches rather than

centimeters. But she cannot review and edit her entered data nor she cannot cancel the transect. So she should pursue and submit incorrect information.

4. Alice (user of ObservAnt) is in the forest and she is using the app. She starts a transect and she finds a mound. So she records the mound's information and she continues to the review page (page five). In the page five she figures out that she mistyped her teacher's email. But instead of editing the wrong information she should submit the wrong information.
5. Alice (user of ObservAnt) is in the forest and she is using the app. She starts a transect and she finds a mound. So she records the mound's information, reviews her information and submits them. Now it is late and she should get back home. So she tries to exit the app but there is no exit button. Instead she is faced with only one option which offers to start over again.
6. Alice (user of ObservAnt) is in the forest and wants to start the app. But in the first page, instead of her name she enters her classmate's name, Bob. So now she fills the forms and sends improper photos to their teacher on behalf Bob. While Bob has no idea about what is going on.