Evaluation Assignment 2
Heuristic Evaluation

App: Water Erosion Prediction Project (WEPP)
Team 5: Swept Away

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1   Undergraduate Design Description

The undergraduate students of team 5 have designed an application which will allow citizen scientists and high school students to utilize the Water Erosion Prediction Project (WEPP) model for predicting hill-slope scale erosion. There are three pages in the application: 1) default landing page, 2) result page and 3) results history page. The default landing page contains a table for user inputs. User can input climate file, soil type, slope and cover percentage to create a new query. Based on user's query, the result page shows the probability of runoff, probability of erosion and probability of delivery. All values are shown as percentage. After displaying the result, a recalculate option is provided which allows users to change the slope and cover percentage. In the results history page, users can see all previous results and quires. From this page, users can also create a new query.

2   Identification of the UI Domain

The application is a mobile application based on exiting disturbed WEPP tool. WEPP is a physically-based hydrology and soil erosion model developed to predict soil detachment and movement. The main objective of this application is to provide a simplified user interface so that it can be used efficiently for educational and research purposes. The primary users are high school students who will use the app to discover effects of erosion in their area. Also citizen scientists may use the app to collect data or compare data for research purpose. The application need to obtain location using GPS or users can manually enter the location. The interface for this application should be user friendly as it will be used by high school students and also it should be efficient for expert users such as citizen scientists.

3   Heuristic Usability Principles

The usability principles of the application are listed below based on Jacob Nielson's ten usability heuristics:

3.1   Visibility of system status:

The app should notify users if the internet connection is lost or if the connection is up again so that they can submit the query. Every time users submit a query, they should be notified for the successful submission. The users should also be notified if there is any change in the data by the scientists.

3.2   Match between system and real world:

The app should use the phrases and words that are familiar to the users as this app can be used by naive users. If there is any technical term, the app should define it so that technically challenged people can easily use it.

3.3   User control and freedom:

In the app, users may submit an incomplete query or they may hit the calculate button mistakenly. In this case, the incomplete inputs should be saved so that users can return later and enter rest of the inputs. Also there should be a confirmation option while submitting the query.

3.4   Consistency and standards:

The app should be consistent. It should use the same words or phrases for input fields or buttons that perform same actions. The app should not use different words for the same actions that means it should follow standards.

3.5   Error prevention:

In the app, users may enter wrong slope or cover inputs or wrong climate file. The app should detect these errors and ask users to submit correct data input. The app can provide some hints or explanation about each input field which will prevent any errors in the input.

3.6   Recognition rather than recall:

The location or some of the inputs can be same for next queries. The previous queries can be saved so that the users can select it from the drop-down menu and they do not need to remember information.

3.7   Flexibility and efficiency of use:

The app should be efficient both for expert and novice users. There should be some features that are not visible to novice users but may help experts to interact with app quickly and efficiently.

3.8   Aesthetic and minimalist design:

The color of the interface is very important as the app may be used outside. Our app deals with lots of information. There should not be any irrelevant or extra information. The important terms or phrases can be highlighted.

3.9   Help users recognize, diagnose, and recover from errors:

If users submit incorrect inputs, they should be notified by proper error message. Users should be provided with another chance to correct the inputs or any incorrect data.

3.10 Help and documentation:

The application should have help section that describes how to use the app. The description should be easy to read and should avoid difficult or technical terms. If there is any technical term, it should be defined properly.

4 Usability Problems

The usability problems of the WEPP application are described below:

- The app should have an input field for entering location. If the app takes the location using GPS, the location should be visible on the default landing page.

- The app should notify the user if internet connection is lost while the user is filling the input fields. When the connection will be up again, users should be able to retrieve their partially submitted query. In this case, partial data should be saved for that user. There may be register/log-in option to identify users. The registration can be optional if users want to use it as a guest.

- The naive users (mostly high school students) may not understand the difference between slope and slope percentage. Also the word "climate file" can be confusing to naive users. The phrases and words should be unambiguous and clear. There should be an explanation or hints beside each drop-down input field.

- The result page should be easy to understand. The users may need explanation about the results. But this explanation can be skipped for expert users. So, the visibility of the explanation should be optional.

- There should be a cancel button beside calculate button. Otherwise, if the users want to change all the input fields, they have to manually clear all the inputs. The cancel or clear button can be helpful to clear the form at once.

- The design of the pages should be more aesthetic so that the high school students will be more interested to learn about the app or continue using it.

5 Critical Usability Concerns

Among the usability concerns mentioned in the above section, there are critical usability concerns.

- The app should notify the user if internet connection is lost while the user is filling the input fields. When the connection will be up again, users should be able to retrieve their partially submitted query. In this case, partial data should be saved for that user. There may be register/log-in option to identify users. The registration can be optional if users want to use it as a guest.

  Scenario: Anthony is a high school teacher. He wants to show his students ho to use the WEPP app. He enters all inputs in the input fields in front of his students. Before hitting

the calculate button, the internet connection was lost. When the connection was up again, Anthony realizes that all the inputs he entered were lost.

- The naive users mostly high school students may not understand what is difference between slope and slope percentage. Also the word "climate file" can be confusing to naive users. The phrases and words should be unambiguous and clear. There should an explanation or hints beside each drop-down input field.

  Scenario: Emily is a high school student and her teacher showed the class how to use the WEPP app. So she tried to use the app in home to learn about it. When she opened the app, she got confused about what to enter in cover percentage. She could not remember what was taught in the class. After some trial inputs, she successfully submitted the query.