U.PORTO

FEUP FACULDADE DE ENGENHARIA
UNIVERSIDADE DO PORTO

IPC Project - Phase 2
2024/2025

Ampify

Professor:
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1. Description of the project

After identifying the need for a system to assist consumers in real-time energy consumption monitoring and cost reduction, we created Amplify with the goal of providing an application that centralizes essential tools for efficient energy management.

Amplify allows users to monitor their energy consumption in real-time, receive detailed monthly reports, personalized alerts for energy surges, and tailored energy-saving tips. Additionally, the **Sustainability Mode** encourages eco-friendly practices, promoting responsible habits such as the use of off-peak electricity tariffs. This feature enables energy savings by allowing users to schedule appliances to operate during lower-cost periods. As a result, the application not only helps reduce expenses but also fosters a positive environmental impact.

At this moment, the ***Ampify*** app has the following main features:

- Login and Register Page;
- Real-Time Energy Monitoring;
- Detailed Monthly Reports;
- Energy Surge Notifications;
- Sustainability Mode;
- Device Scheduling Functionality;
- Intuitive and Interactive Interface;
- User Personalization Options;

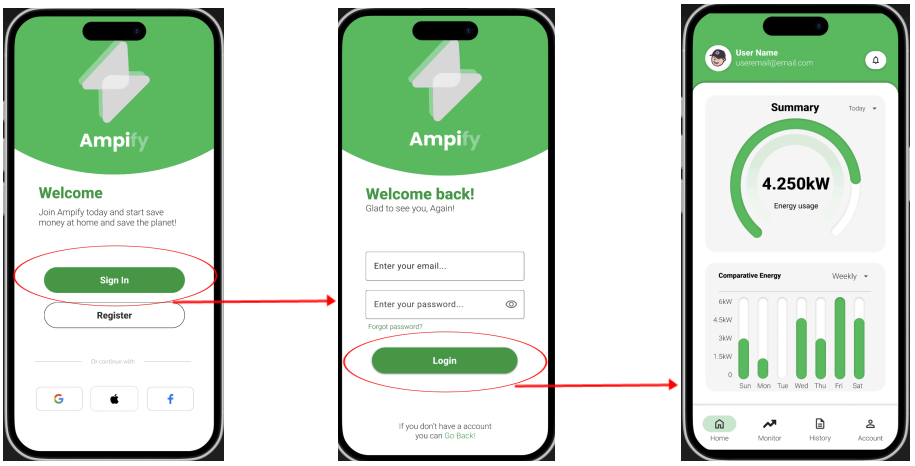
2. Wireflows

2.1) Login and Register Page

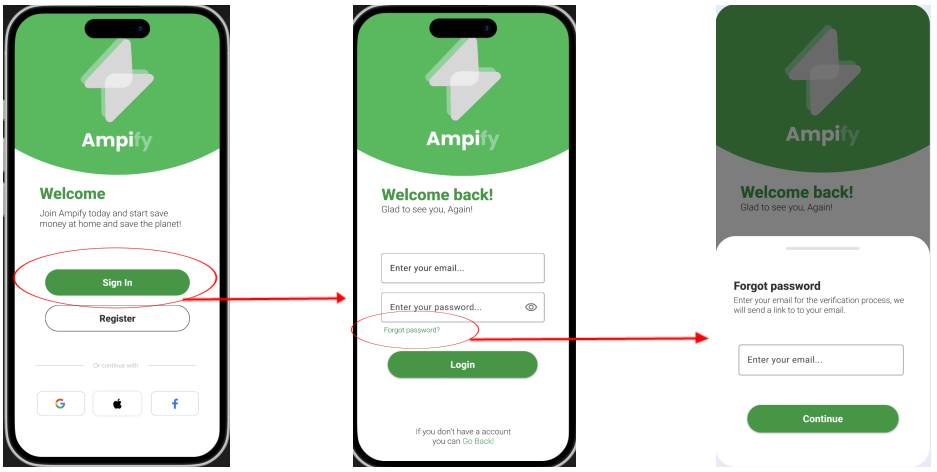
On the login screen, users who already have an account can simply enter their registered email and password to access the application by pressing the "Login" button. For those who have forgotten their password, there is an option labeled "Forgot password?" that allows users to recover their credentials.

If the user does not yet have an account, they can select the "Register" button, which will redirect them to the registration page. Here, they can create a new account by providing their details. Alternatively, users can also sign in or register quickly using third-party services like Google, Apple, or Facebook by selecting the respective icons displayed on the welcome screen. This ensures a seamless and user-friendly onboarding process.

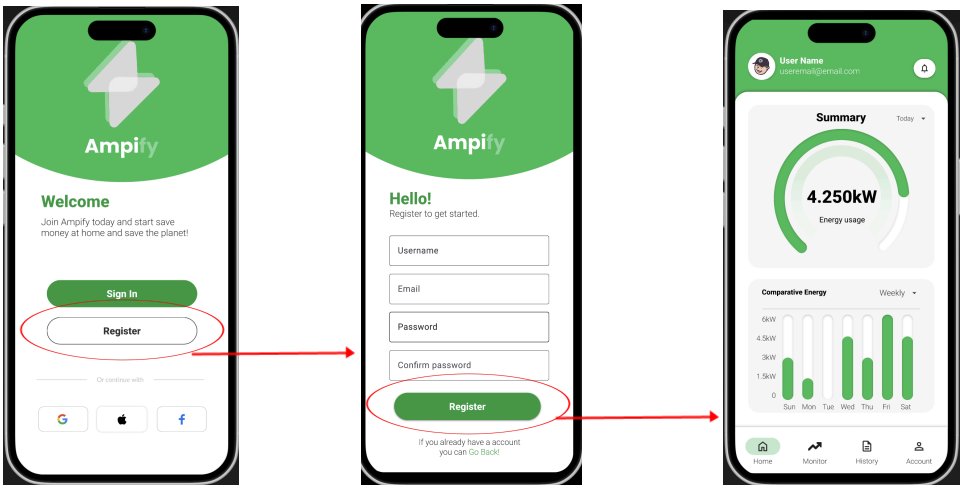
1.In case that you have already an account



2.In case that you have forgotten the password

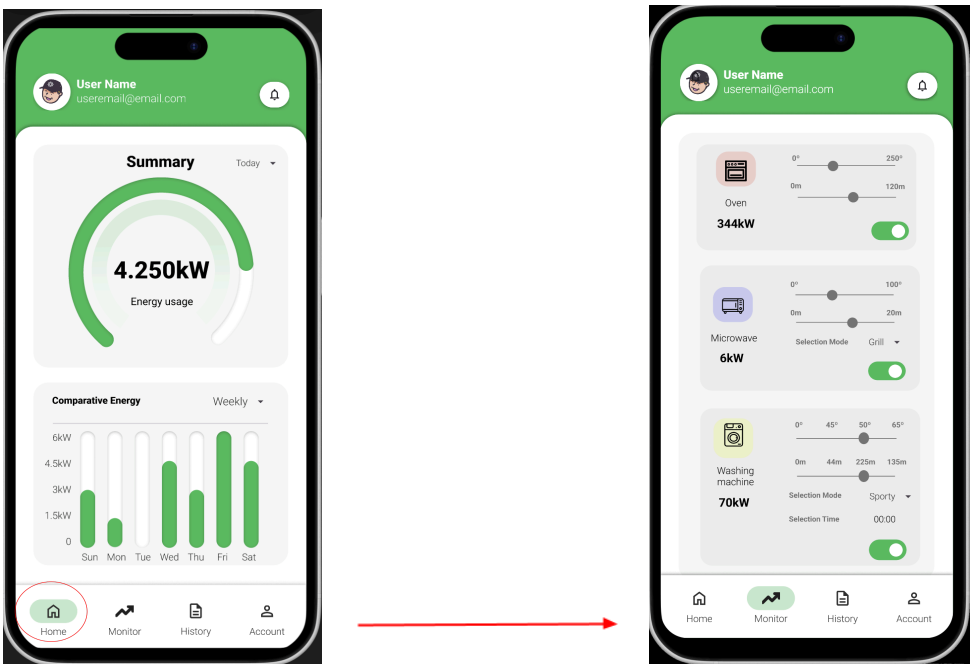


3.In case that you do not have an account yet



2.2) Real-Time Energy Monitoring

The application's Real-Time Monitoring function, which provides a thorough and up-to-date picture of energy use, makes it stand apart. Utilizing this technology, the top chart on the first page shows daily consumption in real time, allowing users to instantly modify their behaviors by seeing precisely how much energy has been consumed during the day. Comparing consumption habits over time is made easier by the bottom chart, which shows a weekly overview with each bar indicating a different day. There is also an option to convert to a monthly chart. Real-Time Monitoring elevates it further on the second screen by displaying the real-time usage of every device, including the washing machine, microwave, and oven. Users may discover and control the devices that have the most influence on their energy use by looking at the detailed information displayed by each item, which includes operating mode, programmed time, and real-time energy consumption. This real-time monitoring feature offers complete and instant management, encouraging cost savings and energy efficiency.



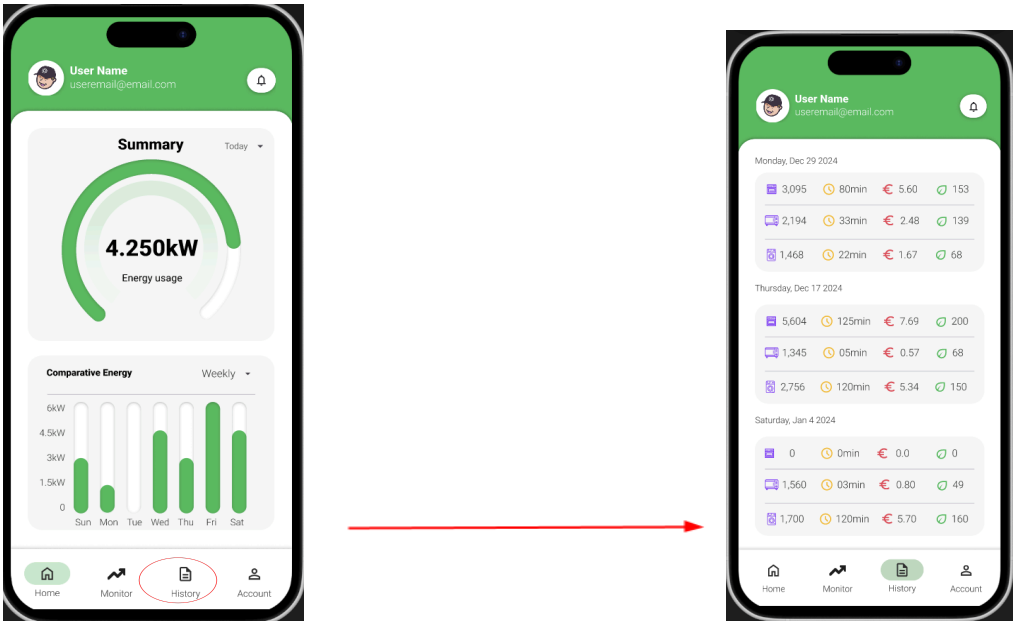
In this example, at the moment, the oven is consuming 344 kW, the microwave is consuming 6kW and the washing machine is consuming 70kW.

2.3) Detailed Daily Reports

Users may get a comprehensive overview of their daily energy use in the Daily History section. This feature shows data by appliance and highlights important parameters like:

- Energy consumption (kWh): The sum of the energy used by every gadget.
- **Usage time (minutes)**: The amount of time spent actively using each device.
- **Cost (€)**: The related monetary expense determined by the amount of energy used.
- **Eco-savings score**: An indicator of energy efficiency that emphasizes the effects on the environment.

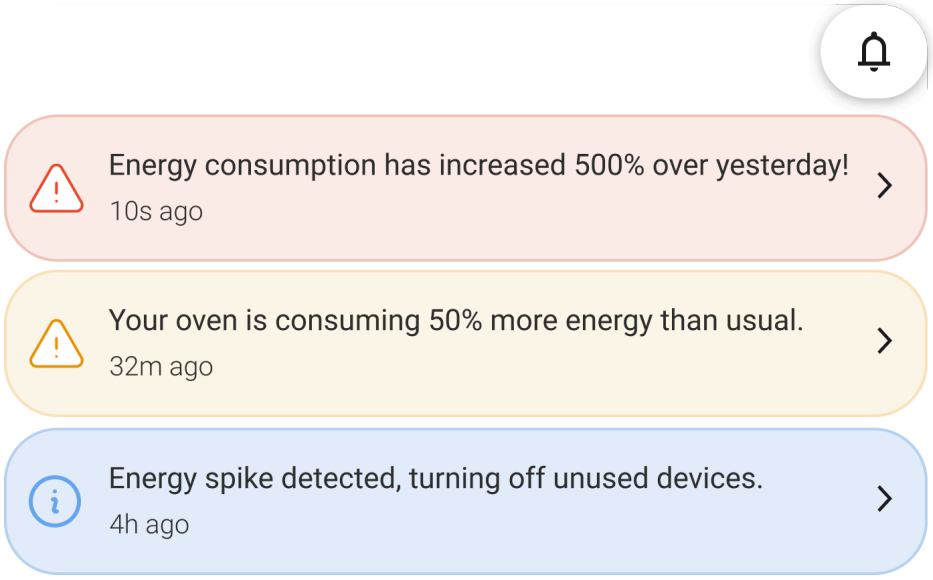
Appliances are arranged according to their individual dates of use, creating a clear timetable for each day. It is simple for users to examine their daily consumption trends, spot expensive equipment, and take proactive measures to maximize energy use. The historical data is particularly helpful for monitoring the advancement of energy conservation and lowering costs over time.



2.4) Energy Surge notifications

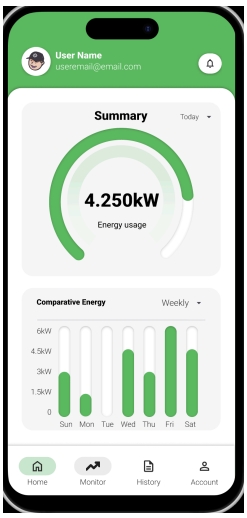
The notifications feature is a crucial component of the app, designed to provide real-time updates on energy usage and actionable insights for users. Notifications are displayed in a clean, scrollable list, with color-coded cards to indicate urgency: blue for general information, yellow for warnings, and red for critical alerts that incentivizes immediate action. Each notification includes a timestamp and an arrow icon that redirects to where more detailed information can be found, or where the user can take action (not yet implemented).

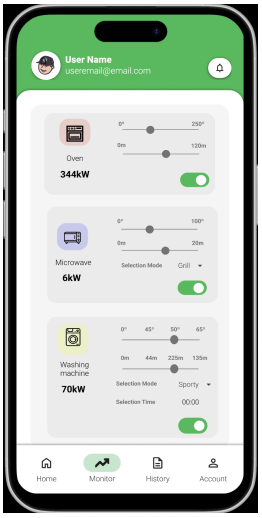
The feature prioritizes usability with a dedicated notification center accessible via a bell icon within most pages, ensuring users can quickly view and manage updates. The design emphasizes clarity, using modern aesthetics and intuitive navigation.



2.5) Sustainability Mode

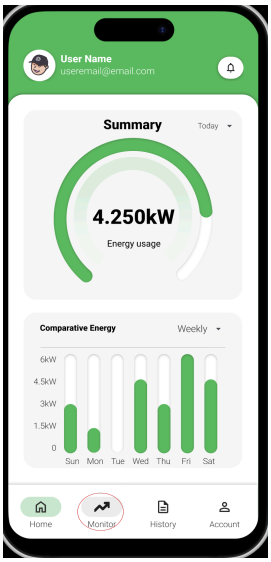
The Sustainability Mode enhances eco-friendly practices by allowing users to schedule appliances, such as the washing machine, during off-peak electricity tariffs using the time selector feature. This not only reduces energy costs but also minimizes environmental impact, encouraging responsible and sustainable energy consumption.

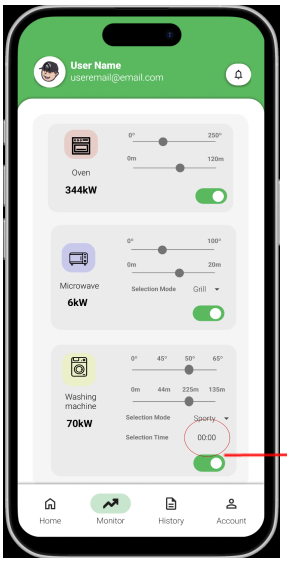


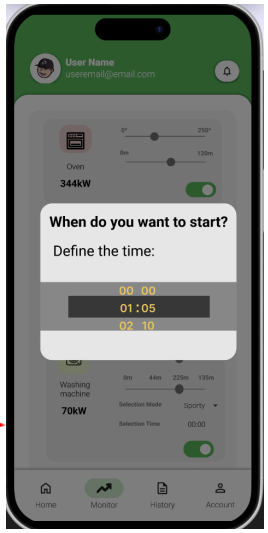


2.6) Device Scheduling Functionality

Users may specify precise start timings for their appliances using the Device Scheduling Functionality, ensuring that they run during desired or off-peak hours. An easy-to-use time selection makes this capability available, allowing for exact scheduling according to the user's requirements. The program enhances convenience and environmental responsibility by enabling users to optimize energy use, save electricity bills, and align usage with more sustainable practices through the integration of this capability with real-time monitoring.

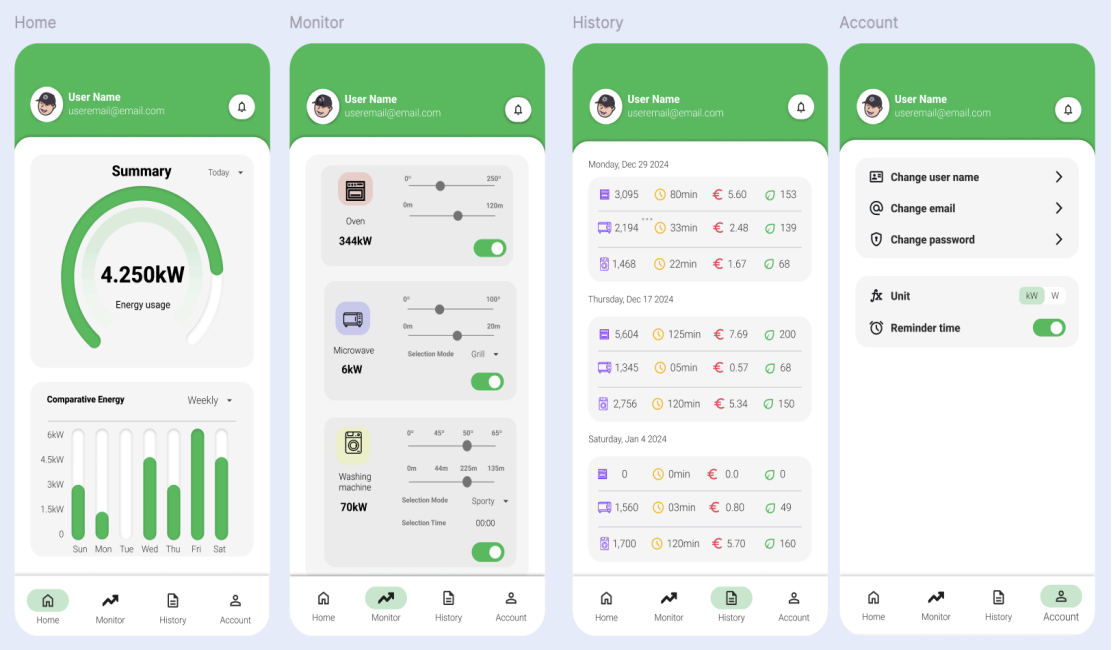






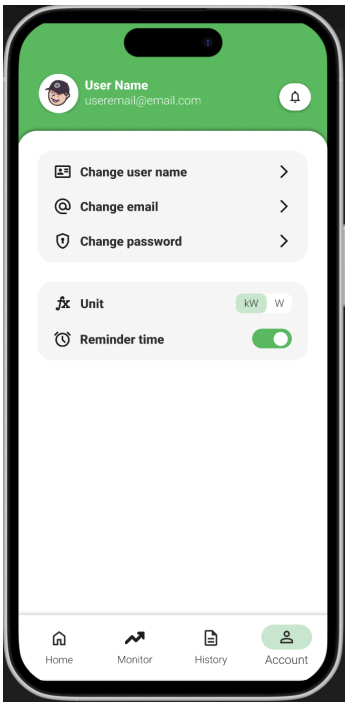
2.7) Intuitive and Interactive Interface

The application's intuitive and interactive interface improves usability and makes navigating easier. Because each page has a clear name, users can quickly and easily comprehend the objective of each component. A crucial component of the program is the bottom navigation bar, which offers simple access to the various sections, including "Home," "Monitor," "History," and "Account," all of which are prominently labeled to help users use it with ease. For instance, customers may easily navigate from the Home page, which shows their overall energy summary, to the Monitor page, which shows the usage of each appliance in real time. Concise captions and descriptions are also included with charts and features to ensure easy data interpretation. This well-considered design guarantees a seamless and effective user experience, allowing users to access relevant information and functionalities without confusion or unnecessary steps.



2.8) User Personalization Options

The application provides a variety of User Personalization Options to enhance the user experience and adapt to individual preferences. Through the "Account" section, users can easily manage their profile by changing their username, email, or password, ensuring their information remains up to date. Additionally, users have control over key settings, such as choosing their preferred energy measurement unit (kW or W) and enabling or disabling reminder notifications. These customization features not only make the application more user-centric but also promote a tailored and convenient experience, ensuring that the app fits seamlessly into each user's daily routine and specific needs.



3. Digested Heuristic Evaluation Results

The application's enhancements as well as areas that still need work to improve the user experience are highlighted by the heuristic evaluation. An outline of the findings is provided below:

Issues Resolved:

- **Non-functional Buttons**: In the past, certain buttons lacked visual cues or a reaction. All of the buttons are again functional and responsive once this problem was fixed.
- **Application undeveloped**: The features have been greatly enhanced, giving the application a more comprehensive and reliable feel and eliminating the perception that it is an undeveloped product.

Remain Issues:

- **Non-functional Buttons**: In the past, certain buttons lacked visual cues or a reaction. All of the buttons are again functional and responsive once this problem was fixed.
- **Application undeveloped**: The features have been greatly enhanced, giving the application a more comprehensive and reliable feel and eliminating the perception that it is an undeveloped product.

4. Corrections to perform in Phase 3

To further improve the application, the following features are suggested:

- **Dual-Rate Electricity Management**: Install a system that lets customers adjust to peak and off-peak electricity rates to maximize energy utilization.
- **Energy Overconsumption Alerts**: Include alerts to let customers know when an appliance uses more energy than is necessary or beyond predetermined energy restrictions.
- **Automated Device Scheduling**: To increase convenience and save money, let consumers program the use of their appliances according to patterns or off-peak times.

5. Conclusion

In the thursday last week we presented that we will going to give monthly report on how much electricity was spent during a month. Although after discussing about the subject we ended up choosing the idea of having daily reports on how much electricity was spent.

In order to simulate how users would initially interact with the system, we developed an application prototype and presented it to people who were not engaged in the creative process. The heuristic reviews we received helped us identify areas for development, and we added and improved features to make the project more dependable and practical.

Because it allows for a thorough examination of the project's areas that require improvement, we conclude that prototyping is crucial to application development. This process provides a clearer, more objective picture of what has to be done to go on in later growth stages.

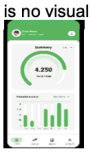
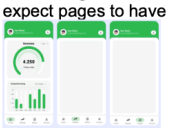
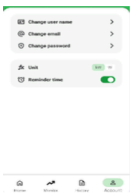
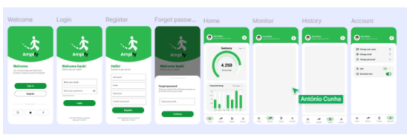
6.Annexes

6.1) Evaluation made by Group 6

HCI Winter Semester 2024 - 2025

Heuristic Evaluation Report

Class Nr.: LEIC0506 – 14.11.24 - Bruno Cunha
Group evaluated: 01 - Amplify
By group: 07

Problem #	Issue (include screenshot)	Heuristic(s)	Severity (1-4)
1	Many of the buttons shown in the presentation/scheme are not working nor show an error message/pop up. In some pages like this one, buttons are purely static. Overall, there is no visual feedback on almost any button. 	1,2,5	3
2	Some pages are still blank, which can confuse users and make them ask if any information is still loading / an error occurred. Users also expect pages to have relevant content in them. 	1,2,10	2
3	The application does not provide warnings for incorrect behavior. (There are no images to show because the mockups are underdeveloped.)	1,3,10	3
4	The application does not include any kind of help or messages (“remember time”) to facilitate user interaction, which can make it confusing to use.	10	1
			
5	The application is very underdeveloped and shows almost no functionality. This makes it very difficult to use, as the buttons don’t lead anywhere, and there is no information provided about "maintenance" or "still in development”. 	1,3,9,10	4