Università degli Studi di Salerno

I.T. Department

Assistive Technology and Universal Design

Assignment 3

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Contents

1   Introduction

With this document we will set up the usability test, analyzing the usability of the ProSign system. The concept of usability is complex to define. We will try to rely on the Nielsen's definition: a measure of the quality of a user's experience interacting with something. A product is usable when it is easy to learn, it allows an efficiency of use, it is easy to remember, it allows few errors of interaction and low gravity, it is pleasant to use.

1.1   Evaluate the usability of an application

The two most used techniques for evaluating the usability of systems are: the so-called heuristic evaluations and usability tests. In the first case, the evaluation is performed by usability experts, with the help of more or less detailed rules, which reflect the state of knowledge of the sector. The well-known Nielsen heuristics and the guidelines provided by Google, which come under the name of "Material Design", are cited. The latter, while not giving a profound usability evaluation (as these are general guidelines) are useful for our purpose.

1.1.1   Nielsen's Heuristics

1. **Visibility of system status**: The system should always keep users informed about what is going on, through appropriate feedback within reasonable time;

2. **Match between system and the real world**: The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order;

3. **User control and freedom**: Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo;

4. **Consistency and standards**: Users should not have to wonder whether different words, situations, or actions mean the same thing;

5. **Error prevention**: Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action;

6. **Recognition rather than recall**: Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate;

7. **Flexibility and efficiency of use**: Accelerators — unseen by the novice user — may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions;

8. **Aesthetic and minimalist design**: Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility;

9. **Help users recognize, diagnose, and recover from errors**: Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution;

10. **Help and documentation**: Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

1.1.2 Material Design

Material Design is based on three fundamental aspects that we will summarize as follows:

- **Material is the metaphor**: Everything is based on the more general idea of Metaphor. Basically you have to try to use abstractions of everyday objects in the creation of your own applications in order to make learning for the end user much easier. Let's take the case of a reader ebook. We tried to make it look like a real book as much as possible, even in the gesture to "flip through pages" so that the user knew a priori how to use this app without the need to learn new concepts. For these reasons also the brightness and the whites take on added value as they serve to highlight elements and make them look as "realistic" as possible.

- **Bold, graphic, intentional**: This category includes the so-called "typographical elements". Imagine having to read a written book without the subdivision into chapters or paragraphs, without the use of bold or italics to highlight the keywords, without titles larger than the text and without, in general, the use of white space. Such a book would be unlawful. This example is explanatory for what is meant by this design principle. You must use the intentions, colors, typographical elements in general and white spaces in the best possible way, so as to allow the user easy use of the information and actions to be performed. This also serves to better immerse the user in the experience and usability of the app.

- **Motion provides meaning**: We must make optimal use of the gesture (which in general are very simple to manage at the code level, thanks to the numerous libraries made available, such as MotionEvent, etc.). The gestures are used to make learning and the use of every day of our apps much easier and faster. Let's take as an example the zoom on a photo. It is much easier to use pinch to zoom than to insert a button that may not be intuitive for our purpose. Another important factor, which is part of this principle, is the use of non-invasive and aggressive feedback. These must accompany the user to always give feedback on the action he is doing and must always be clear and unambiguous. Furthermore, we must always try to use a single environment for carrying out our actions, or if this is impossible, give the impression of this. We must always maintain the integrity of our application, trying to change objects or screens while maintaining continuity and consistency, without sudden changes, abrupt or too excessive.

In the second case, the evaluation consists in making users perform precise tasks (Tasks) that simulate the use of the system.

2 Specification of usability requirements identified during analysis and design

The usability principles find their natural collocation if they are 'cascaded' into the development life cycle of a system.

2.1 Identifying the user's specifications

it is a fundamental phase whose conduct requires the use of tools and methods of analysis on the user population and the tasks that they must perform in a given application context. The fi nal purpose is to produce a set of speci ces of more detailed and targeted user requirements. In fact, many studies have clearly demonstrated that most of the failures of a new technological system can be attributed precisely to the lack of adherence between the characteristics of the product and the improperly identified user requirements. In the case of ProSign, after a careful preliminary analysis, the following functional requirements have been identified:

- Profile Management:
  - Login (with email, facebook and google);
  - Logout;
  - Modify personal information;
  - Modify passwor;
  - Forgot password;
  - Save user email and password;

- Learning ASL Management:
  - Learn ASL Alphabet;
  - Learn ASL Words;
  - Save Words Learned.

- Communication Management:
  - Text to Speech;
  - Speech to Text.

- VideoCall Management.

2.2 User acceptance testing

Once a technological product has reached the final stage of development, it is necessary to verify with appropriate tests if, in the real workplaces where it is destined to operate, positions are detected against the acceptance of the system in terms of services requested to the user and mental predispositions.

3   Study Setting

Before beginning, in this chapter we will describe the steps and the motivations that led us to make certain decisions. To make a usability test, without a proper preliminary organization, it is appropriate to set up a plan to perform these usability tests correctly and in this chapter we will describe the steps and motivations that led us to make certain decisions.

Having very general guidelines available, which could inflict part or all of our tests, as general guidelines can turn into overly subjective assessments and dictated by personal tastes, we decided to combine multiple test methodologies so as to obtain results as more reliable and secure. It becomes clear indeed, in front of the discrepancy of the approaches, that the types of rules (among which we mention those of Nielsen, which we have already discussed in the previous chapter) should above all be interpreted and understood, placed in their proper context, adapted to their own objectives. Not all rules adapt to all situations.

Important to add that the subjective component can not be excluded a priori, and indeed could be a valuable help to improve the interfaces and usability in general, but there is a need to greatly increase the range of users and testers, so to compare more sensibilities, experiences and possible tastes and to draw up improvements that can make the use experience of this application as much as possible.

So we will join the heuristic evaluation, thanks to the help of the Decalogue of Nielsen and the rules dictated by the Material Design, already mentioned in the previous chapter, to get a first redesign and try to solve the first problems of usability.

Once this first phase has been completed and once again verified that the improvements made to the application respect the aforementioned heuristics, we will proceed with the tests with the users.

3.1   Evaluation based on experts

As already extensively discussed in the previous chapters, we will use the Nielsen Decalogue and the principles of Material Design to draw up an in-depth evaluation, for each of the specs and screens identified in paragraph 2.1.

4 Analysis of the Results

The analysis of the results is the conclusive phase of the Usability test. Here we have drawn conclusions on the results obtained and therefore on the problems encountered.

4.1 Heuristic based analysis

We have previously used Nielsen Heuristics (as indicated in chapter 1). Below will be named again and for each of these will be highlighted if these are respected or not and why.

4.1.1 Visibility of System Status

The ProSign system respects this heuristic thanks to the presence, in each screen, of a clear title and explanatory icons. However, there is a lack of pop-ups or labels that require confirmation of a given action.

4.1.2 Match between system and the real world

This heuristic is widely respected thanks to the use of self-explanatory icons that allow a combination of the screen (reachable through that button with that icon) and functionality offered by that screen itself.

4.1.3 User Control and Freedom

This heuristic is widely respected thanks, in the first place, to the use of the tabmenu that allows quick and intuitive access to all system functions and thanks to the presence of many combinations or methods to enter information and receive the required results.

4.1.4 Consistency and standards

The style and logic of the various screens is consistent with the whole system.

4.1.5 Error Prevention

Errors are always prevented thanks to the help of guided choices to obtain certain results. The critical issues have been correctly managed thanks to the help of visual feedback that show the error and how this needs to be corrected.

4.1.6 Recognition rather than recall

Heuristic totally respected thanks to the aid of schematic and simple to use screens.

4.1.7 Flexibility and efficiency of use

This heuristic is not respected as there is only one chance to perform each task.

4.1.8 Aesthetic and Minimalist Design

This heuristic is totally respected because every request corresponds to a clear and precise result, without the presence of frills or useless elements.

4.1.9   Help Users Recognize, Diagnose and Recover from Errors

This heuristic is fully respected as there are not very understandable error messages or from which it is difficult to find a solution to return to their work.

4.1.10   Help and Documentation

Even if the system turns out to be totally usable even without the thorough reading of documentation (since the features are shown in a simple and very usable way), the total lack of documentation causes the non-compliance of this heuristic.

4.2   Material Design based analysis

The case of ProSign turns out to be very particular because this application is born as a "Cross Platform" system, that is usable on any operating system. So an analysis based on the Material Design of google, that is oriented mainly to the Android operating system would not be advisable. We have in any case decided to use this parameter as ProSign, despite being a multiplatform application, has many points in common with android applications and lends itself well to this type of analysis. As in the case of Nielsen's Heuristics, also Material Design was presented in Chapter 1 and again the precepts of the Material Design will be renamed and for each of these it will be highlighted whether they are respected or not and why.

4.2.1   Metaphor

This precept is widely exploited thanks to the help of icons and images that show and abstract the action that will be performed through that screen.

4.2.2   Bold, Graphic, Intentional

This precept is totally observed and information is easily and quickly usable.

4.2.3   Motion Provides Meaning

This Precect is fully respected because it makes extensive use of the gestures where necessary (for example to look at the 3D model that explains the ASL alphabet). Moreover, there is always consistency between the various screens because the same graphic elements are always used, in compliance with the design rules.