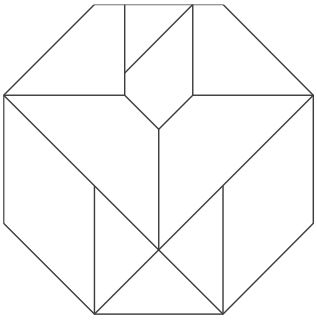

Mobile application for student attendance in class

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Table of contents

List of figures

1. Introduction

In August 2021 VIA University College situated in Horsens, opened new facilities located in the center of the city to improve the education of its students. To improve the education of the students it is essential that the university can verify the skills and abilities of its students and professors using all the tools and metrics possible. To have knowledge of the attendance of students in class can affects to a more positive motivating and learning environment. The lack of attendance in some classes can negatively affect the academic performance of some students, questioning the quality of the university's teaching and damaging its reputation. Handwritten absence of students is a laborious and tedious task that teachers do not have time to do that is why the implementation of a digital system to manage students' attendance helps to optimize the classroom scheduling.

To create this application, it is essential to design and test a prototype according to the persona that it has been decided to describe and will use it.

Therefore, this document will expose the techniques that have been used to improve the design for the application as well as the changes that have been made during the iterations to show the result that has been reached.

2. Methodology

To implement an interactive design that satisfies as many users as possible, it is essential to apply a methodology that allows iterating different phases during the development of the design until the most optimal design is found. Therefore, it has been decided to implement a methodology divided into different phases that allow iteration as many times as necessary.

To come up with an idea for the task, all the group members brainstormed and discussed what we could accomplish. Second, a decision was made on the idea, and after that the persona design process began, making it easier for the group to develop proper requirements for the idea and for the specific group of people according to the persona.

We have decided to implement a methodology based on an iterative design since is a design methodology based on a cyclic process of prototyping, testing, analyzing, and refining a product or process. Based on the results of testing the most recent iteration of a design, changes and refinements are made. This process is intended to improve the quality and functionality of a design.

1. **Requirements**: in this phase, the persona has been analyzed, who will use the application and the requirements have been specified.
   To have a reference to which user the application will be used and to better understand their needs, curiosities and understand how they behave, it has been decided to design a person with common student attributes. (Appendix B – Persona).
   These attributes have been chosen because it has been thought that they tend to be the most common among VIA University students and therefore in the next phase implementations the changes and modifications will be less necessary.

2. **Design implementation**: in this phase, the analyzed requirements of the "persona" have been implemented and two prototypes have been created: low-fidelity and high-fidelity prototyping.
   The low-fidelity (lo-fi) prototyping is a quick and easy way to translate high-level design concepts into tangible and testable artifacts. The most important role of lo-fi prototypes is to check and test functionality rather than the visual appearance of the product. (Appendix C – Low-fidelity prototype).
   With this lo-fi prototype it has been possible to visualize and test a functional design among the team members. This has been possible because to the advantages it offers are:
   - *Inexpensive*. The development is extremely easy to create and modify.
   - *Fast*. It's possible to create a lo-fi prototype in just few minutes. This allows product teams to explore different ideas without too much effort.
   - *Collaborative*. Since lo-fi prototyping doesn't require special skills, more people can be involved in the design process. Even non-designers can play an active part in the idea-formulation process.

The high-fidelity (hi-fi) prototypes appear and function as similar as possible to the actual product that will ship. The implementation of this prototype was undoubtedly the longest and most complex. However, it was the best way to analyze the reaction and behavior of the people in front of the application (Appendix D – High-fidelity prototype). The advantages of implementing a hi-fi prototype are:

- *Meaningful feedback during usability testing.* During usability testing sessions, test participants will be more likely to behave naturally - as if they were interacting with the real product.
- *Testability of specific UI elements or interactions*. With hi-fi interactivity, it's possible to test graphical elements such as animated transitions to see the reaction of users.
- *Easy buy-in from clients and stakeholders*. It gives clients and potential investors a clear idea of how a product is supposed to work.

3. **Testing**: in this phase, the prototypes created have been tested with people whose profiles have coincided with the "persona" described. (Appendix A – Prototype testing)
   Testing it's about catching customers in the act, and providing highly relevant and highly contextual information.
   The final prototype has been tested with the users with the following present objectives:
   1. Determine whether testers can complete tasks successfully and independently.
   2. Assess their performance and mental state as they try to complete tasks, to see how well your design works.
   3. See how much users enjoy using it.
   4. Identify problems and their severity.
   5. Find solutions.

   Once the reaction of the users was written and analyzed, the design team began to discuss the observations. The feedback from the end user decides whether the solution suggested by the designers has been fruitful or not. If the end user does not approve the solution or all the members of the group of designers have not reached a point in common, then the entire process has to be iterated. The concept of iteration is hence central to the process of design.

4. **Evaluation**: in this phase, the results obtained have been analyzed and the necessary changes have been made in the design.

   To correctly evaluate the result obtained from the testing it is necessary to compare the requirements with the expectations.

   Afterwards, the reactions of the users have been analyzed and the points that have been correctly implemented and have been discussed with the team of designers. Also, the same have done with the points that have been implemented incorrectly.

   Finally, the changes have been implemented in the prototype and this process has been repeated until the designers have reached a common agreement or the users have seen improvements.

5. **Deployment**: after establishing the last changes, a final prototype has been designed and presented.
   Finally, it has been decided to present the final design to teachers and students to begin the application creation phase.

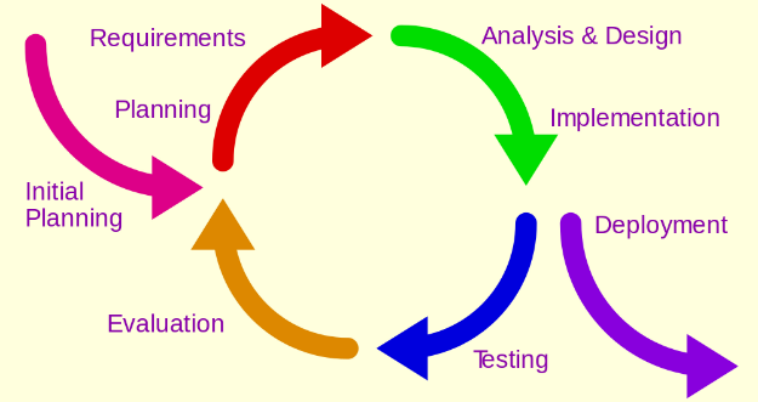

Figure 1. *Design implementation*

The main reason why it has been decided to use this iterative design:

1. It provides robust user feedback
2. It can catch problems earlier
3. It measurably improves usability
4. It's efficient and cost-effective

3. Findings

Group designed the VIA Attendance application, which gives a solution for the class attendance mark interruptions. Design process steps of the VIA Attendance application gave a general understanding of:
Making a "Persona" and making all the needs according to the persona or keeping in mind what would fit in the application in relation to the "Persona" are two ways to discover the requirements for the product.
We took the opportunity to create an alternative prototype to the ItsLearning marking attendance system when creating the requirements.
We noted the majority of itsLearning's pros and cons, as well as the types of issues that users face.
According to the itslearning pros and cons, we made the requirements.
Our first prototype was a low-fi prototype, the first version of our idea realization, which had to be tested as soon as possible.
During the testing of the prototype, we observed the users who were participating as test persons, to find out what kind of problems test person has during the test of the prototype, then after the test, we asked some general questions about the prototype such as: How was the experience? Have you had some problems, or misunderstandings about the prototype? Etc.
From the observation, our team discussed the requirements for a new prototype, what needs to be changed, what functionality we need to add, and what we need to get rid of.
And design process loop started again, we made new requirements, made a hi-fi prototype, and tested it.

All our feedbacks are in Appendix A – Prototype testing.

4. Discussion

The finding of requirements was not difficult; we had the ItsLearning attendance system, so we had the opportunity to gather the needs for our system.
ItsLearning marking system is a student's attendance system, where you can set up a class, append participants, and when the class starts, you can mark the attendance of each of the participant.

After the first prototype was made, we had to test it out, to get feedback from people. For testing, we used **participant observation technique**, where participant gets a prototype of the application and tries to use it with the short introduction to the application beforehand.
In terms of the designed prototypes, the implementation has been a huge success because the feedback obtained (whether favorable or negative) has had a huge impact on how the prototype was redesigned because it has allowed us to explore new and completely different concepts and points of view.

For the testing, the low-fi prototype was initially tested with a student. With this test, a quick response was obtained allowing the team to approach the prototype from a different perspective.
Then the hi-fi prototype was designed and tested with 2 VIA students. The personal data of the two subjects could not be disclosed due to privacy concerns.
The steps followed to test both prototypes were:

1. They were presented a mobile phone with a high-fidelity prototype with no information about the project that has been developed to see what their first reaction was and how they would first interact with the application.
2. The users were given at least 10 to 30 seconds to interact with the prototype without the assistance or supervision of the designers.
3. When the users couldn't figure out how to engage with the app or move on to the next screen, one of the supervisors instructed/directed them through the process until they were able to use the application fluently or until they were able to complete the task.
4. Finally, they were informed about the application and its purpose so that they would know what they were doing and why. Then, they were invited to use the prototype again and provide feedback on their true feelings, sensations, and emotions.

5. Conclusion

As a result of completing this assignment, the team of designers has been able to analyze new perspectives and objectives on how to develop the user interface of the international project carried out in ENG-FPRPM-A21.

It has been possible to broaden the perspective of the initial work proposed by the team as well as receive a faster and more direct feedback before the actual implementation of the project, saving hours of work and ensuring that the application's design is more accurate to the persona described.

Afterward the consolidation of the new results obtained after the design and implementation of the final prototype, the next step consisted of reformulating the functional and non-functional requirements and the delimitation of the application always keep in mind the application's fundamental objective, which is to create a tool that allows the VIA Horsens to improve its future use of room capacities by collecting data of real-time occupation of rooms by students during regular lectures.

Finally, before starting the production of the application, the user stories and use case description were also modified for a faster and smoother implementation. All this process worked to reduce the production time of the final application and at the same time obtain the best possible result in the shortest possible time.

6. Appendix

1. Appendix A – Prototype testing

Figure 2 *Testing user 1*

Feedback 1

Disadvantages:

- Test person was starting to put its credentials by pressing username first, since it's still a prototype, test person got stuck.
- After test person logged in, there was a confusion of what needs to be done next, so short guide had to be made.

Advantages:

- UI is easy to use.
- Attendance is not needed to be done anymore by the teachers.
- Saves lecture time.

Feedback 2

Disadvantages:

- Tried to enter her credentials, even though the credentials have been entered after username button was pressed.
- Did not like a menu which was at the top of the corner.
- Was confused when she attended the lecture, thought that there is more to do.

Advantages:

- UI Was easy and clear to use.
- Got stuck after logging in screen, but after couple of seconds reading what was written on the screen, figured it out by herself how to attend the class.
- For her, application felt like it was real.

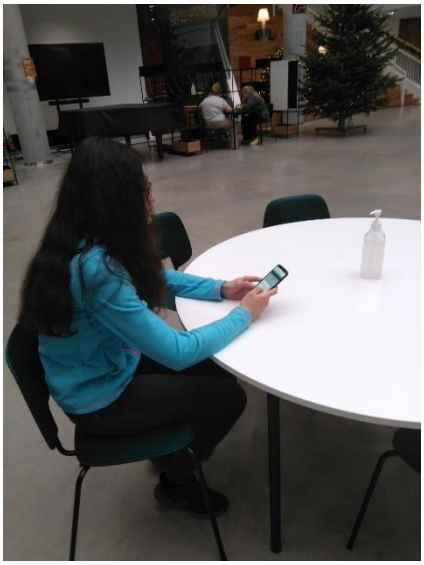

Figure 3 *Testing user 2*

2. Appendix B – Persona

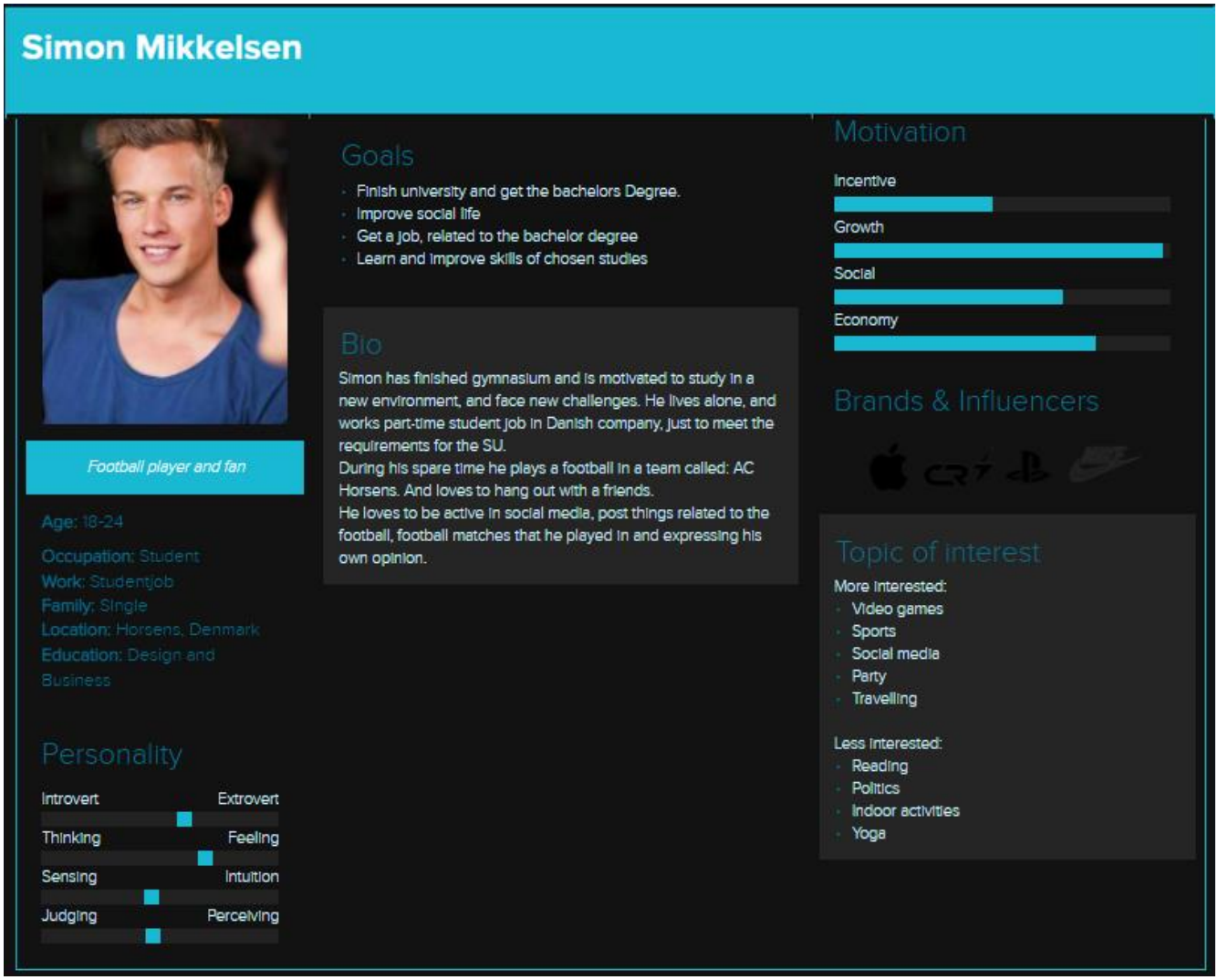

Figure 4 *Description of the persona who will use the application*

3. Appendix C – Low-fidelity prototype

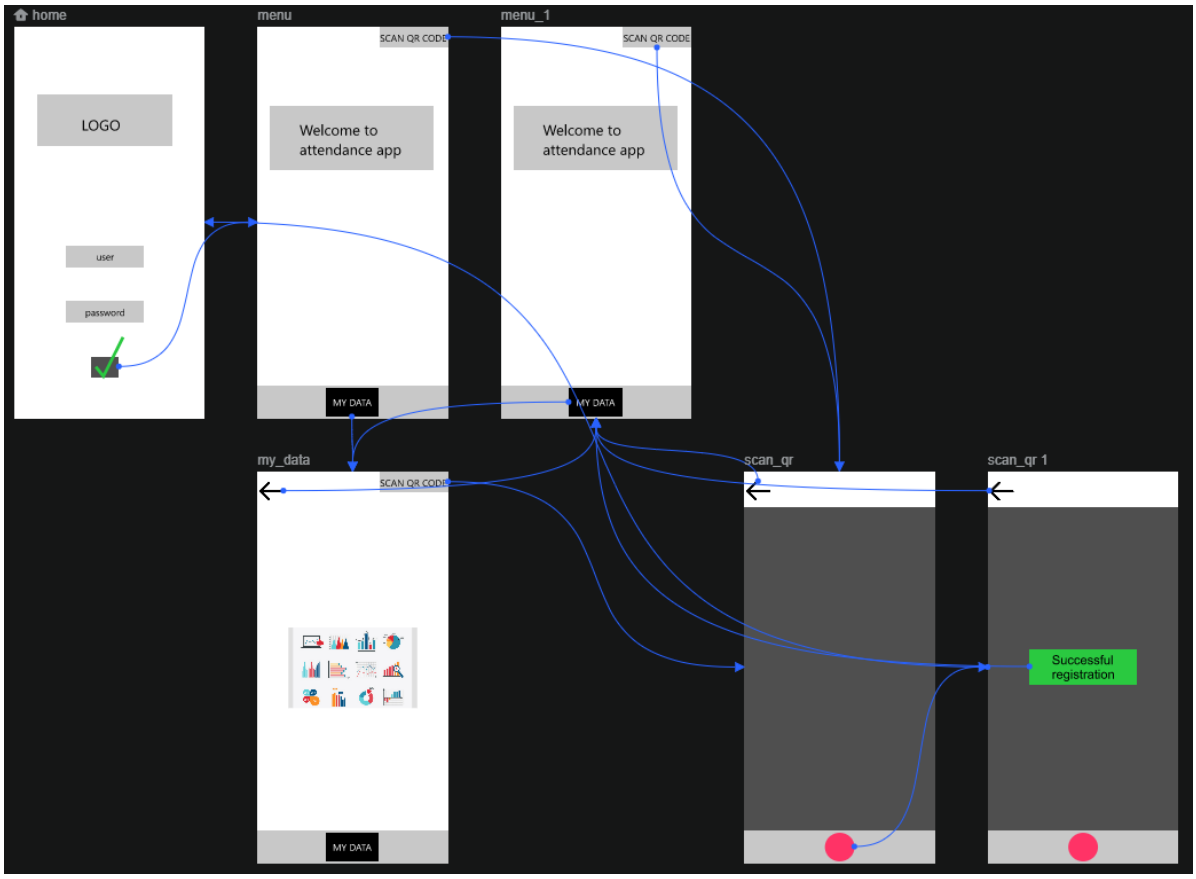

Figure 5 *Low-fidelity prototype design*

4. Appendix D – High-fidelity prototype

Figure 7 *Hi-fi camera screen*

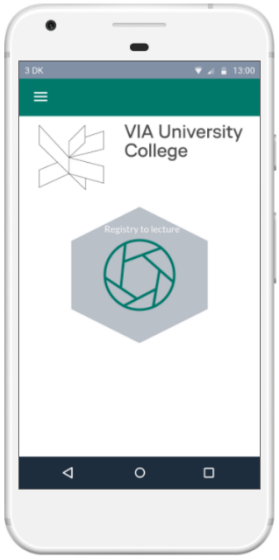

Figure 8 *Hi-fi home screen*

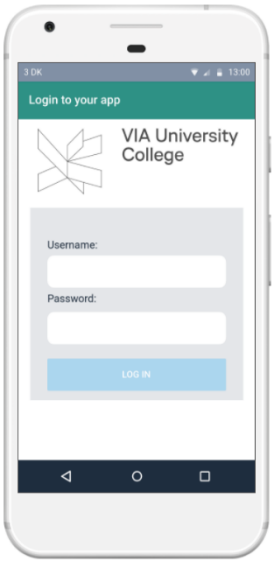

Figure 9 *Hi-fi log in screen 1*

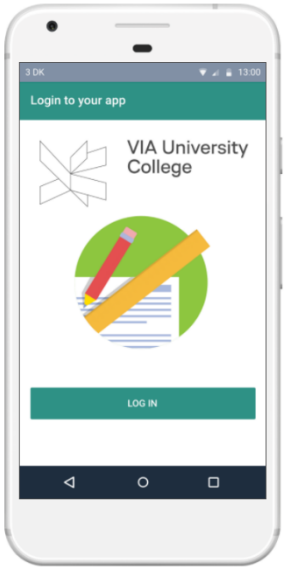

Figure 10 *Hi-fi log in screen 2*

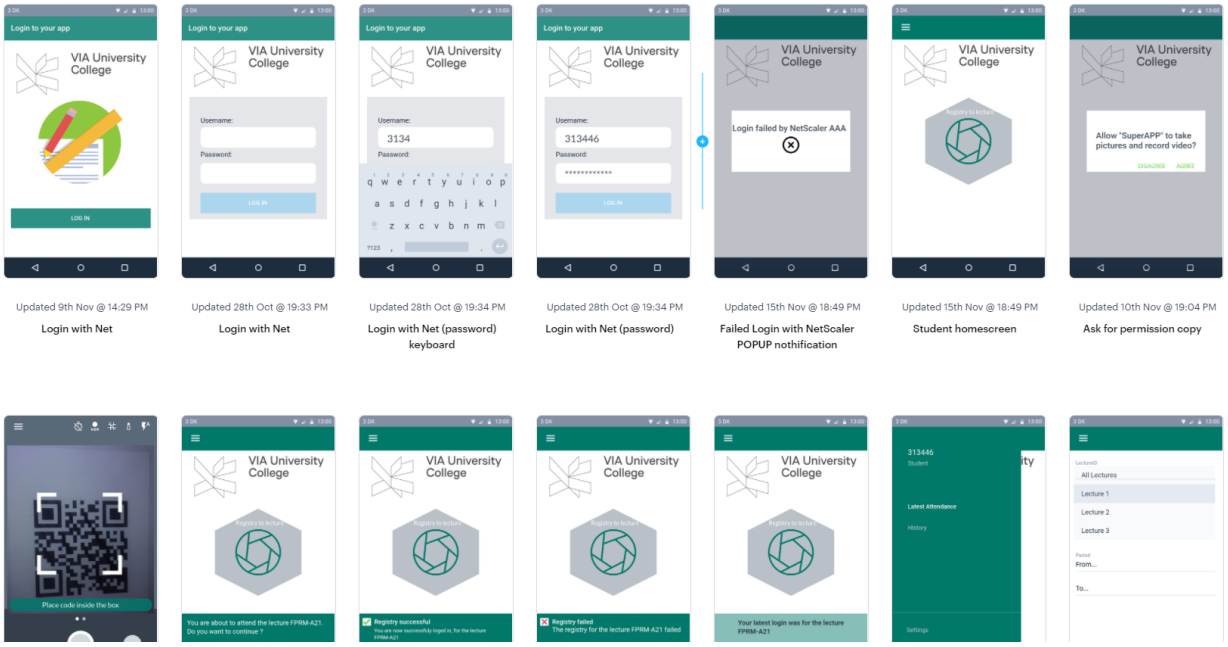

Figure 6 *Low-fidelity prototype design*