Future development of the product and ideas

Responsible team behind document: Customer Service

Important users of this document (Recipient): Region Östergötland's development and analyst team.

Short content summary: In this document the Customer Service team has compiled different ideas and thoughts regarding the future development of the product and design decisions that have been made. This is to pass on as much knowledge as possible that has been collected throughout the project to the customer.

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1. Purpose

The purpose and aim of this document are to serve as an inspiration for further development of the delivered product. The ideas that are presented below have been discussed internally with the development team in order to ensure the viability of the ideas. The ideas should be viable in terms of resource, competence and have a value for the end-user. In the document, some design decisions are presented and motivated. The document will also cover the possibilities to scale up the product and what support and maintenance that might needed

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2. Ideas for further development

In this section, ideas and suggestions of approaches for further development are presented. Most of the ideas and suggestions presented are based on interviews and results from the alpha and beta tests.

2.1. Receive errand number via SMS or email

In all user tests, a reoccurring wish from users was to automatically receive the errand number so that it would be easily accessible later. As it is in the application, the errand number has to be copied or written down manually. The wish was for the number to be sent to some contact detail entered into the application.

In the pre-study interviews, users were asked how they would prefer to receive the errand number, and the answers were either SMS or email. SMS was preferred over email if a choice had to be made.

2.2. Automatically transfer patient data to Region Österland's journal system

After discussions with doctors in the early stage of designing the product, an idea for further development came up. The idea is to link the product's system to Region Östergötland's own journal system. The idea is to allow created cases for burn injuries to be automatically registered in Region Östergötland's journal systems so the personnel at the hospital does not have to manually register the burn injury after using BIC's.

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2.3. Communication plan for how to spread awareness of the web application amongst hospitals in relevant areas

When interviewing doctors in the initial end-user interviews, they mentioned that they had information on that they could call the burn unit in Linköping to ask questions, but they did not have a clear way to find the burn unit's on-call number. One doctor had to call through three different switchboards which were very time consuming and not appropriate for the stressful situation. Something that might be worth looking into is how information about the application will be spread, and how it will be ensured that every emergency room and surgical unit in the relevant area (South of Sweden) knows where to find both the application and the on-call phone number.

2.4. Connect the application to the senders' different medical record systems

From interviews with doctors in the pre-study as well as from the beta testing with medical students, a wish to somehow integrate the system with the medical records system was expressed. The doctors interviewed explained that while they could call the burn unit in Linköping for consultation and send them information, the documentation responsibility still remains on the sending doctor. Therefore, they wished to save all the information they had entered in the application, directly in the patient's medical record. They pressed that it is important to have all information about a patient collected in one single place, otherwise vital details may be missed.

2.5. Add a page where the sending doctor can login and see the recommendations from BRIVA written down

From the interviews with doctors in the pre-study, a page where the sending doctor could login and see treatment recommendations given by BRIVA was requested.

One doctor told us about a situation where he/she had received a patient in the emergency room who had burns all over the upper part of the body and was very stressed and scared. The doctor had called the burn unit, sent pictures and received information on what to do, but he/she was also stressed and there was a lot of commotion around him/her at the time. Due to this, the doctor did not remember all the information about treatment that was given to him/her over the phone and thus had to call the Linköping unit again to ask them to repeat some information.
This is why the doctor wished for a page where the information could be written down and sent to him/her. This would also make it easier to forward information to another doctor who might treat the same patient later on.

2.6. Add a short photography guide

In pre-study interviews, as well as in beta testing, it was expressed that a photography guide would improve the picture sending process.
For example, the users were unsure how to best take the photo, how close-up the photo should be taken, in what lighting, etc.

One related example that might be useful: one medical student told us that when referring patients with skin conditions to a skin specialist, photos are taken in a certain order - you start from a distance and then take pictures closer and closer to the affected skin area, in steps. This helps to give the receiving doctor a better understanding of where on the body the skin area is situated, how severe the condition is, etc. The student suggested that something similar might be beneficial for burn injuries as well.

2.7. Function for adding multiple errands quickly

The question was raised in user tests whether the application would be easily used if the sending doctor should need to send several errands for different patients - for example, several people burn injured in an accident. Therefore, a suggestion for future development is to study this use case separately.

2.8. A description page on information and patient security

This is an idea that did not come from any test person themselves, but rather is a conclusion on something that might be useful given that many of the test persons interviewed expressed uncertainty as to whether the use of the application would be allowed in regards to patient information security.
The idea is that there should be a page within the application where the dealings with all sensitive information are explained, in relation to hospital policies and sending information between different regions (many expressed that this is very difficult and regulated in other medical matters).
There could be a link to this information page in proximity to fields where sensitive information is meant to be uploaded (for example by the upload picture field).

2.9. Enable different doctors to access the same errand

This idea came from the pre-study interviews. One of the doctors explained that it would be very important to have access to all the information sent between the receiving end in Linköping and the local sending end. It was also important that this information was not tied to a specific person, but rather to the clinic or to the patient. This because a patient might be hospitalized for surveillance etc. and then be treated by several doctors. For instance, one doctor could have a night shift and then the day shift doctor takes over. In this situation, both doctors need to be able to see the information sent and more importantly, the information received from Linköping.

2.10. Integrate the on-call schedule for quicker access to the on-call phone number

This idea simply means that the process of calling the hospital switchboard in order to reach the on-call doctor would be reduced to just a direct call. This would be done by connecting the on-call schedule to the application, in order to find the accurate phone number for the person on call. (This assuming of course that there is no special on-call number that is always available, we were told there was only the number to the switchboard at the Linköping hospital).

2.11. Implement One-Time-Password as a way of authentication.

As of now the only way to authenticate yourself as a sender is through BankID. One additional way to do it would be to let the user authenticate themself using a one-time four digit code. The sender would get this code from one of the doctors on Briva while they are on the phone. This would be a quick and safe way to authenticate each user. In order to make this solution work, the application would require a back-end service to make the authentication requests and a way for the doctors on Briva to generate the four digit code.

3. Design decisions

In this section, some design decisions will be listed and explained. This is to motivate why certain decisions were made and why the product was designed in a certain way.

3.1. Building the application with the Angular framework

We decided to build the application with Angular which is a open-source Front-end framework based on TypeScript. This decision was based on the customer's preferences together with Angular being a widely used framework that is useful in the developing of the product. Due to Angular being a widely used framework, maintenance and further development of the application is handy for a new team.

4. Scalability

This section discusses parts of the product relevant to the application's scalability.

- Data is not stored in components but in case-data.service. It might be difficult to maintain if the application grows bigger. In that case, we recommend replacing this service with a redux store for state management.

- Communication with Filecloud is done in HTTP.service. This part is easily changed if the web application needs to communicate with another storing solution come up.

- We have created templates for components that exists in the folder 'shared'. This will save a lot of work if you wish to create new components and pages.

5. Support and maintenance

This section discusses parts of the product relevant to the application maintainability.

- Since we use sass most style and style logic are stored together in the assets folder, which makes it easy to change color scheme, button style or whatever style change which is desired.

- We have used a documentation tool called Compodoc which makes it easy for your developers to understand our code and maintain it in the future.

- All communications with the outside are done with services which in turn pass data along to components to display, which means that components are easily replaced.