Summary

Development of an Ultrasound Machine for the Emergency Department - A usability study of the user and the usage

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The main task for the personnel at the Emergency Department is to provide accurate and fast assessments of patients' injuries and illness in order to provide the proper healthcare that is needed. The user should easily and quickly be able to use the available equipment without having to doubt if it is used in the correct manner. In the acute situations, that often occur in the Emergency Department, the time factor is a critical issue and minutes can be the difference between life and death for the patient. Therefore extra time cannot be spent on fiddling and scanning for right input devices. It is therefore important that the equipment used in the Emergency Department do not hinder physicians in performing the task of providing an accurate and safe healthcare. Equipment that is experienced to be complex and difficult to use is the ultrasound machine. As a consequence it is common that labels are used to ease the usage of the machine, since they offer extra guidance how to operate the machine. Or the machine is not used at all and an important source of information is lost. From a human-machine perspective this is not an optimal solution and an indication of a poor usability. Due to the poor usability the ultrasound machines available in the Emergency Departments are today often not used in the extent they could.

The problem is solved by using a user centred perspective on the development process of the machine and investigate what the user actually needs to be able to do in the setting of the Emergency Department. The goal is to identify the needs, wishes and demands posed and examine how the machine should be designed from a usability perspective to meet these requirements. To achieve the goal physicians working at the emergency department where interviewed and participated in different usability test. The outcome of the interviews and usability test were analysed from ergonomic theory and the gathered result was the foundation for the concept generation work.

The final concept presented consist of a battery powered main unit consisting of a touch screen, eight buttons, a large handle, transducer holder and a cable hook. The machine only contains the functionality that is needed in the Emergency Department and all fine-tuning elements have been removed. The important functions are placed in a way that they easily can be scanned by the user. The interface has also been stripped down to the bare essentials.