Public Summary

The facilitation of on-demand cassette printing in the gross room

This bachelor thesis explores the analysis, design and implementation of on-demand printing of cassettes in the gross room of the department of Pathology in the LUMC.

The gross room is the first step in the process of diagnosing diseases. To process the patient tissue, samples are put into small cassettes (4cm x 2,8cm x 0,6cm). These cassettes are ejected from a printer that prints an identification number and barcode on them. Currently, the cassettes are printed by technicians, and given to a macro-technician or AIOS, who are excising the patient tissue.

There are four workstations in the gross room. Three workstations can be used to excise tissue, while at two workstations, next to the 2 cassette printers, cassettes can be printed. The objective of this thesis is that it will be possible to excise tissue and print cassettes at all workstations, autonomously and simultaneously (on-demand). This means that the macro-technician or AIOS can excise, and print cassettes themselves without needing the technician.

During the analysis phase, the main research question: "*How can the gross room setup be adapted to facilitate on-demand printing?"* was answered with the help of sub-questions. These were divided into the problem analysis and the improvement analysis. In the problem analysis it became clear that the wish for on-demand printing stemmed from a nonconformity as a result of an external audit (ISO15189) by the Dutch Accreditation Council. The problem report concluded that there was a considerable risk of patient sample mix-ups in the previous set-up.

With the help of on-demand printing, this would significantly lower the chances of a patient sample mix-up. The cassettes will immediately arrive at the patient tissue when requested, therefore reducing the risk of swapping patient samples.

After the analysis phase, it was determined that there is a need for two solutions: one physical and one digital. The physical solution aims to find a way to transport cassettes to the workstations, allowing all four workstations to make use of the two cassette printers. The digital solution involves making changes to the computer's interface to ensure that all necessary programs and tools for this part of the process can be accessed smoothly.

This physical solution is a double slide that is attached to the cassette printer. It can guide the cassettes either left or right, depending on which computer the print request came from. This is done by an actuator that is controlled with a servo motor. To facilitate this solution, one of the cassette printers must be relocated in the room, moving this printer to the other side of the table.

The digital solution is an interface layout that is focused on usability. For excising autonomously, 4 programs are needed. The mock-up that was created is the design of the lay-out of these four programs, and their necessary interactions. This layout makes sure that all necessary parts and information of these programs are visible and accessible. The real design will be flexible to adapt to personal preferences that differ per role in the gross room.

Together, these two solutions make on-demand printing of cassettes possible in the gross room.