A Prototype for Process-Based Intraoperative Documentation

Irina Killer[1], Oliver Burgert, PhD[1]
[1]Reutlingen University, Reutlingen, Germany

Description of the Problem or Gap

Documentation of clinical processes, especially in the perioperative are, is a base requirement for quality of service. Nonetheless, the documentation is a burden for the medical staff since it distracts from the clinical core process. An intuitive and user-friendly documentation system could increase documentation quality and reduce documentation workload. The optimal system solution would know what happened and the person documenting the step would need a single "confirm" button. In many cases, such a linear flow of activities is given as long as only one profession (e.g. anaestesiology, scrub nurse) is considered, but even in such cases, there might be derivations from the linear process flow and further interaction is required.

Methods:

We first investigated how standard terminologies for modelling of processes could be used to describe clinical processes, especially surgeries, in sufficient detail[1]. Since routine process documentation can be modeled with little branches, Business Process Model and Notation (BMPN) was used to model a) the team time-out questionnaire of a specific hospital and b) the perioperative process documentation. As reference, the glossary of perioperative process times and metrics of the German societies of anaesthesiology, surgery and operating room management[2] was used, and a subset based on the specific needs of our clinical partner was selected. The human machine interaction was implemented using a Raspberry Pi Model B (Revision 2.0) with additional touchscreen (Adafruit PiTFT, 2.8" display, 320x240 pixel). As input device, the Griffin Powermate USB-multimedia-controller, which can be used as dial and push-button, was used. For each step, the confirmation of the pre-determined step modeled in the workflow is done by a single push of the dial. If there is a derivation of the process or a step is skipped, the user can use the dial to select the respective option. Modifications shall be annotated in the commonly used documentation system.

Results:

We built a system prototype as described above (Figure 1). The technical evaluation showed that the user interaction concept is feasible. The technical concepts allows additional input modalities like foot switch or voice commands.

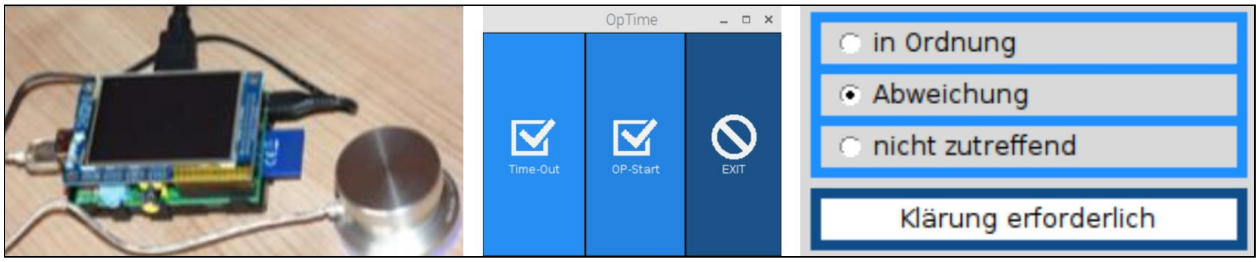

Figure 1. Hardware setup (left), start screen (middle), selection options for procedure steps and team time-out (right).

Conclusion

The first prototype shows promising results and will now be integrated in a prototypic clinical healthcare architecture to allow interaction with hospital information systems which are storing the documentation information.

References

1. Wiemuth, M Junger D, Leitritz MA, Neumann J, Neumuth T, Burgert O. Application fields for the new Object Management Group (OMG) standards Case Management Model and Notation (CMMN) and Decision Management Notation (DMN) in the perioperative field. IJCARS 2017;1439-1449.
2. Bauer M, Waeschle RM, Rüggeberg J, Meyer HJ, Taube C, Diemer M, Schuster M. The German Perioperative Procedural Time Glossary - A concerted recommendation of the German societies of anaesthesiology, surgery and operating room management. Anästh Intensivmed 2016;57:669-683.