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# A Method for Developing Standard Patient Education Program

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**Abstract.** In Denmark, patients being treated on Haematology Outpatients Departments get instructed to self-manage their blood sample collection from Central Venous Catheter (CVC). However, this is a complex and risky procedure, which can jeopardize patient safety. The aim of the study was to suggest a method for developing standard digital patient education programs for patients in self-administration of blood samples drawn from CVC. The Design Science Research Paradigm was used to develop a digital patient education program, called PAVIOSY, to increase patient safety during execution of the blood sample collection procedure by using videos for teaching as well as procedural support. A step-by-step guide was developed and used as basis for making the videos. Quality assurance through evaluation with a nurse was conducted on both the step-by-step guide and the videos. The quality assurance evaluation of the videos showed; 1) Errors due to the order of the procedure can be determined by reviewing the videos despite that the guide was followed. 2) Videos can be used to identify errors – important for patient safety – in the procedure, which are not identifiable in a written script. To ensure correct clinical content of the educational patient system, health professionals must be engaged early in the development of content and design phase.

**Keywords.** Patient Education, digital, standard, empowerment, flipped classroom, e-health

## 1. Introduction

Involving patients in their own treatment, especially patients with complex and/or lengthy patient pathways show potentials in improving the overall care. [1] The overall care of the patient includes increased patient safety which may occur by reducing the patient-nurse contact interaction, which will eliminate hospital-acquired infections. In addition to potentials for better overall care, engaging patients allows for specialized health care personnel to focus on specialized tasks rather than routine tasks such as educating patients. When complex patient pathways are to be partially managed by

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patients, new patient safety issues arise. Consequently, increased focus has been given to patient training and patient safety in self-management. [2, 3, 4]
In Denmark, patients being treated on Haematology Outpatients Departments get instructed to self-manage their blood sample collection from central venous catheter (CVC) through written material as well as face-to-face education. [2] Blood sample collection from CVC is a highly complex and comprehensive procedure, consisting of more than 50 steps to be accomplished. The responsibility for correctly instructing and educating the patient and approve future self-management rests with the specialized nurse, and the patients only option for quality control of their understanding of the procedure is to consult with the written material. Self-management of a complex and risky procedure jeopardizing patient safety. The aim of the present study was to determine important aspects in in the development of a standardized digital patient educational program for a complex and risky clinical procedure to increase patient safety.

## 2. Methods

To identify important aspects in the development of a standardized digital patient education program, we have designed and implemented a case-specific digital patient education system for complex and risky procedures, with the case being educating and training of outpatient in blood sample collection from CVC. For this purpose, we employed Design Science Research (DSR). [5] The designed system is called PAVIOSY. If it is possible to transform a complex and risky procedure from written and static instructions to ubiquitous and dynamic video-, text- and audio-based instructions, we can suggest a method for developing standard digital patient education programs. The digital patient education program is designed with inspiration in flipped classroom theory. [6] By using lecture videos, it is possible to pause and replay. By letting patient watch the procedure at home through the internet, they will have the time to reflect on important questions they can ask later during an educational training lecture. After approval for self-management, the patient can use the video as a support while performing the task. In this way, the patient can avoid making mistakes in the complex procedure, see figure 1.

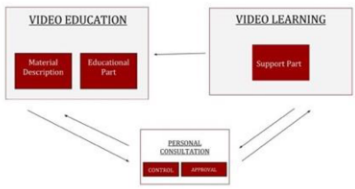


**Figure 1** illustrates the application of the digital patient education program through interactions between consultation, education and support

### *2.1. Evaluation*

To develop a step-by-step guide containing the correct procedures and performance of blood sampling from CVC, we collected data in cooperation with two specialized nurses from the Department of Haematology at Aarhus University Hospital**.** Data consisting of the procedure withdrawing blood samples from a (CVC) were eligible for inclusion. Evaluation of the requirements were systematically done through think aloud test which was performed independently with two specialized nurses where mistakes and errors were identified in the details of the video-, text- and audio based material, in figure 2 the different steps taken to evaluate the system are illustrated. Inclusion criteria for participating was: nurse, specialized in heamatology, more than 2 years' experience. A proximally one hour preparation was required in advance to read the requirements to the design. The evaluation let to a quality assurance of content. As our focus was correct performance of the procedure no patients were involved.

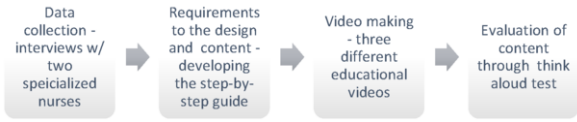


**Figure 2** illustrates the steps taken to evaluate the digital patient educational system.

### *2.2. Video making*

Three different educational videos were made based on the approved step-by-step guide. The videos include:

***I***. *Material description*: In this video, the respective materials used in the procedure are introduced.

***II***. *Educational part:* This video shows the correct performance of the procedure so the patient can prepare in advance. The video is filmed from the front of the "patient".

***III.*** *Support part:* This video also shows the correct performance of the procedure – only filmed from high angle. The patient can then perform the procedure according to the support video. The video has paused between each step so that the patient is not lost in the performance.

The subject in the videos from the educational- and support part who was performing the procedure was a nurse.

## 3. Results

### *3.1. Step-by-step guide*

We developed a step-by-step guide containing the correct procedure and performance for blood sampling from CVC. The guide was based on the data collection and it implied 44 steps. The guide was validated twice for correct content by one of the specialized nurses. Corrections of content was made between the two quality assurances.

### *3.2. Design*

The three videos contain a voice-over function, describing what is shown in the video, see figure 3, where level IIII(A-C) refers to the videos. Keywords from the voice-over description was added to the videos. Functions as slow-motion, animation such as red-ring, video-still photograph and zoom were added, to clarify the performance of each step. Different camera angles (frontal and high angle) were used depending on the specific video. In the support part, high angle was used to exclude confusion by giving the instruction in a reflected image.

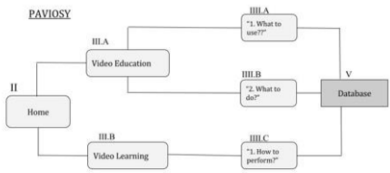


**Figure 3** illustrates system design.

### *3.3. Video Evaluation*

The videos were evaluated through think aloud test and thereby quality assured by another specialized nurse. Errors regarding patient safety such as performing the correct procedure as well as correct development of the videos was identified in the video evaluation. Furthermore, our results from the evaluation showed:

- Identifiable errors highlighted by the videos: Video can be used to identify errors due to the order of the procedure. As an example; In both the step-by-step guide and the videos, the sterile wipe is placed at the end of the CVC before removing the white plug. This can lead to contamination of the CVC, which can cause infection. Therefore, the plug should be removed before adding the sterile wipe at the end. Even with a well- described and validated step-by-step guide, errors due to the order of the procedure can be determined just by reviewing the details in the videos.
- Unidentifiable errors highlighted by the videos: Video can be used to identify errors in the procedure, which are not identifiable in a written guide. As an example, the step-by-step guide contains a description of proper hand disinfection. During this performance, disinfectant lands on the table where the procedure material is placed. The table must be clean and dry when used in the procedure.

## 4. Discussion

Blood sampling from CVC is a risky and complex procedure based on the number of steps. The procedure is often handled by clinicians and is not intended for self-administration. CVC infection are a major cause by sepsis, and the prevalence is 18.2%

of all registered nosocomial infections in Denmark. [7] Recent Randomized Controlled Trial shows a significant reduction in the intervention group (2.55 catheter related infections(CRI) incidence pr. 1000 catheter days) which received individualized training and supervision by a clinical specialized nurse with the aim of becoming independently responsible for their own catheter care - Compared with the control group which followed the standard CVC procedure with a nurse - 5.91 CRI incident pr. 1000 catheter days[2]. In this way patient safety can be increased by making the procedure patient administered. Patient education involving multimedia to a highly complex and risky procedure is an important factor, as the flipped classroom method in this case not is tested. Patients getting digital patient education suggest that moving picture have an advantage over stills when it comes to teaching a good technique[3]. Furthermore, digital patient education makes the training session significant less boring, and increase the patient satisfaction. [8].

### 5. Conclusion

We developed a standardized digital patient educational program for blood sample collection from CVC. Our study identified that health professionals need to be engaged in the development of content (e.g. step-by step guides) for digital patient education systems to ensure quality of the material. In addition to this, specific patient safety aspects should be made clear/explicit in these resources. This can be done by adding functions such as: slow motion, zoom, video-still-photograph or by attaching voice over to the video to ensure patient safety. Finally, the resources such as videos which will be accessed by patients also need to be quality assured by health professionals prior to technical implementation.

## References

[1] Ishikawa, H., & Yano, E. (2008). Patient health literacy and participation in the health-care process. Health Expectations, 11(2), 113-122.
[2] Møller T, Borregaard N, Tvede M, Adamsen L. Patient education – a strategy for prevention of infection caused by permanent central venous catheters in patients with hematological malignancies: a randomized clinical trial, Journal of Hospital Infection, 61 (2005), 330–341.
[3] Savage I. Providing information on metered dose inhaler technique; Is multimedia as effective as print, Journal of Hospital Infection, 20 (2003), 552–557.
[4] Sundhedsstyrelsen. Patient education: - a health technology assessment, summary. København; 2009.
[5] Hevner AR, March ST, Park J, Ram S. DESIGN SCIENCE IN INFORMATION SYSTEMS RESEARCH. MIS Q [Internet]. 2004 Mar;28(1):75–105. Available from: http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=12581935&site=ehost-live
[6] Exploring the Bergman & Sams School of Flipped Learning – Flipped Classroom Workshop[Internet]. [cited 2017 Nov 7]. Available from: http://www.flippedclassroomworkshop.com/bergmann-and-sams-school-of-flipped-teaching-learning/
[7] Central ‘enhed for Infektionshygiejne. Landsprævalensundersøgelsen efteråret 2012 [Internet]. 2012 [Cited 2017 Nov 7] Availavle from: http://www.ssi.dk/~/media/Indhold/DK%20-%20dansk/Smitteberedskab/Infektionshygiejne/Praevalensundersogelser/Data%20fra%20landspraevalens/Landsprævalensundersøgelsen%20Efterår%202012.ashx
[8] Fox, Martin P. "A systematic review of the literature reporting on studies that examined the impact of interactive, computer-based patient education programs." Patient education and counseling77.1 (2009): 6-13.