

# PDA's, Barcodes and Video-films for Continuous Learning at an Intensive Care Unit.

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## **ABSTRACT**

This describes a prototype made to support and augment continuous learning for the employees at an Intensive Care Unit. The prototype is made from off-the-shelf products. The prototype is a mobile interface consisting of a Personal Digital Assistant (PDA) and a barcode reader. On the PDA are a number of short video-films produced by the employees (especially the nurses) at the Intensive Care Unit. The content of the video-films vary from instructions about medical equipment to films about handling of sores, reflections on "best practices" etc. Barcodes distributed in the Intensive Care environment give access to the video-films. A running prototype will be demonstrated and the conference participants will be able to try the prototype themselves. Furthermore a short video-film will give examples of nurses producing video-films, discussing the video-films, and using the PDA prototype.

## **Keywords**

Learning, Intensive Care Unit, Running Prototype, Personal Digital Assistant, Self-produced Video-films, Barcodes.

## **INTRODUCTION**

The prototype described has been developed and used at an Intensive Care Unit to support continuous learning for the staff. Off-the-shelf products has been used for the prototype. Firstly the research project is described in short together with an introduction to the Intensive Care Unit and the design process. Secondly the prototype is described in more detail.

## **THE KLIV PROJECT**

KLIV is the Swedish acronym for "continuous learning within healthcare", which is a ongoing research project between the Intensive Care Unit at the University Hospital in Malmö and the Interactive Institute.

## **The Intensive Care Unit**

In total 140 people work at the Intensive Care Unit at the University Hospital in Malmö. About 100 staff members have taken part in the design process.

At the Intensive Care Unit the number of various medical machinery is higher than elsewhere within the hospital. A large part of the nurses work involves handling and being updated on the medical machinery, still the care for the patients is always in the center of their work. The learning culture is primarily oral (Björgvinsson and Hillgren, 2001-a), where for instance "oldtimers" instruct "newcomers" in work-procedures etc. (Lave and Wenger, 1991) or where experiences are shared like war-stories (Orr, 1996) about how a specific situation is taken care of, or how a problem is solved.

## **The research**

The research project started investigating how information-technology that supports learning can be integrated in a both technical intensive and socially dynamic work context as the Intensive Care Unit. The resulting design concept suggested that the staff produce videos and make these available on handheld computers through barcodes out in the work context (Björgvinsson and Hillgren, 2001-a, Björgvinsson and Hillgren 2001-b). It was decided to continue the research and develop a prototype and investigate how it was used in everyday work at the Intensive Care Unit. The staff found the prototype much more interesting than the written instructions from the equipment providers. Viewing colleagues on film gave confidence about how "things are to be solved here" but gave simultaneously an opportunity to reflect on the work practice and discuss it with colleagues. It was found that video was excellent as a common reference point for

learning. Furthermore it was found that learning not only takes place during the use of the PDA with the video-films. In fact learning begins as soon as two or more colleagues decide to make a film and starts discussing and negotiating how the film should be made. Learning also takes place when other colleagues participate in watching and evaluating if the level of details are appropriate and if the quality of the film in general is good enough (Björgvinsson and Hillgren, 2002).

### The Design Process

The design process is iterative, interdisciplinary and "user-centered" focusing on collaborative inquiry and design (Brandt, 2001). The prototype has been developed in close contact with the nurses and other staff at the Intensive Care Unit. We have been present during their everyday work and



Figure 1: The staff from the Intensive Care Unit produces short video-films on diverse learning topics. While filming the cameraman edits the film on location in the camera.

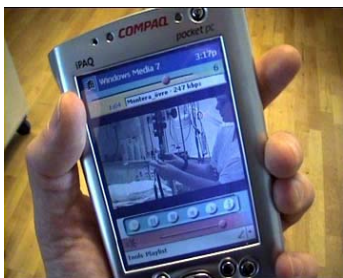


Figure 2: The prototype with a video-film playing. While watching the film it is possible to pause/play, fast forward, increase/decrease volume, stop, and move quickly to another part of the film using a timeline.



Figure 3: Barcodes are associated to the films and placed out in the work context where needed. A PDA equipped with a barcode reader activates the movies.



Figure 4: A nurse uses the prototype while preparing medical equipment she did not know beforehand. She was very pleased with the handy prototype providing both images and audio instructions.

they have participated in various kinds of workshops both inside and outside their work environment.

### THE PROTOTYPE

During the first half of 2002 the co-authors from Blekinge Institute of Technology have taken part in developing the prototype. They have been responsible of connecting the PDA with the barcode-reader and develop an application, which made sure the right film was fetched and played after a barcode was read (Bergqvist and Emilson, 2002).

### Customization of off-the-shelf products

The prototype consists of an iPaq Pocket PC, a barcode-reader for the iPaq, software, and labels with images and barcodes to put out in the work context. All products are off-the-shelf that are easy to buy. With the help of discussion forums and mailing lists on the World Wide Web it was relatively simple to make a Visual Basic application that made it possible to start the movies with a barcode reader to play in the media player PocketTV. The content of the video-films however are contextual information from the Intensive Care Unit produced by the staff themselves. The whole process of producing video-films and using PDA's and barcodes has been very successful in augmenting continuous learning.

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