Conformance Checking Challenge 2019

*"**The CVC Case**"*
(Description)

IEEE Task Force on Process Mining (CCC19 Committee)
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This challenge is based on the interdisciplinary research *"Process-Oriented Medical Education (POME)"* conducted by the School of Medicine and the School of Engineering of the Pontificia Universidad Católica de Chile

For citation and more info:

- "Tailored Process Feedback through Process Mining for Surgical Procedures in Medical Training". Lira, et al. PODS4H18
- "Delphi method to clinical consensus for installation of central venous access for training purposes". de la Fuente, et al. (to appear)
- "Control-Flow Analysis of Procedural Skills Competencies in Medical Training through Process Mining". de la Fuente, et al. (to appear)
- "The Role of Process Feedback through Process Mining for Surgical Procedures in Medical Training". Lira, et al. IJERPH (to appear)

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Central Venous Catheter (**CVC**) refers to installing a catheter (tube) in a central vein, aiding on delivering fluid or medications to the patient, among other uses.

The general idea of the procedure is the following:

1. The procedure is prepared, the vein is identified with the ultrasound, and the patient is anesthetized.

2. A large hollow needle (**trocar**) attached to a syringe is inserted in to the vein with the help of ultrasound.

3. The **syringe** is used to check if there is blood return (the trocar is well installed) and it is removed from the trocar if so.

4. A **guidewire** is inserted 30 cms through the trocar, and then the trocar is removed.

5. The pathway is widen and the wire is used to advance a **catheter**.

6. Finally, the wire is removed and the catheter is checked.

Let us consider a course where an institution teaches future doctors how to perform a CVC installation.

The course is structured as follows:

- Students learn about the procedure
- Students perform a first pre test (**PRE**)
- Students practice freely to get used to the procedure
- Students perform a final post test (**POST**) to ensure they acquired the required skill.

This challenge include the PRE and POST executions of **10 students**

Model

A **Delphi** method was designed to establish clinical consensus for medical procedures (and processes in general), and it was used to define a BPMN model for the Central Venous Catheter installation with ultrasound.

The Delphi panel was answered by 13 experts from 3 medical specialties and 8 medical institutions.

The challenge contains the model in **BPMN** notation, **Petri Net** notation, in **PNG**, and **Natural Text**.
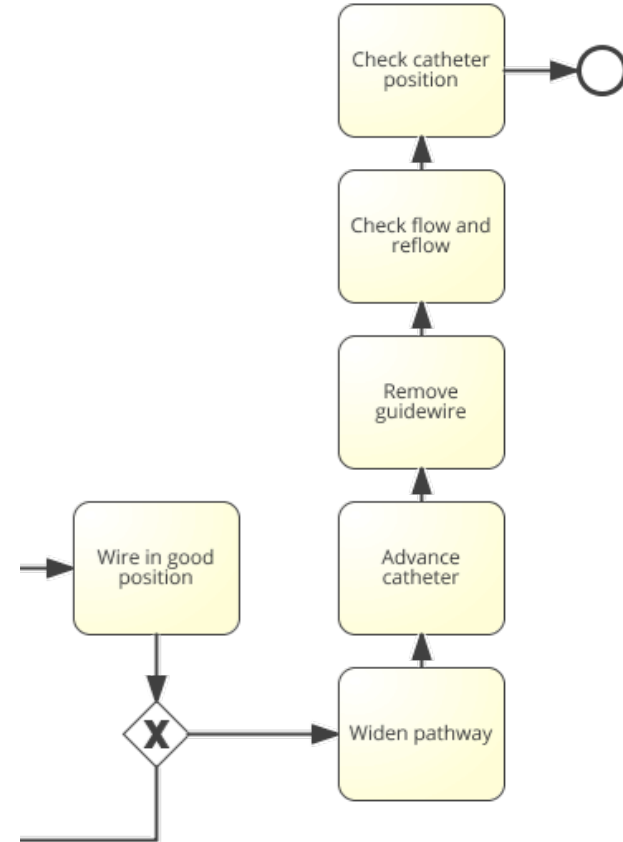
Log

A video was recorded of each execution.
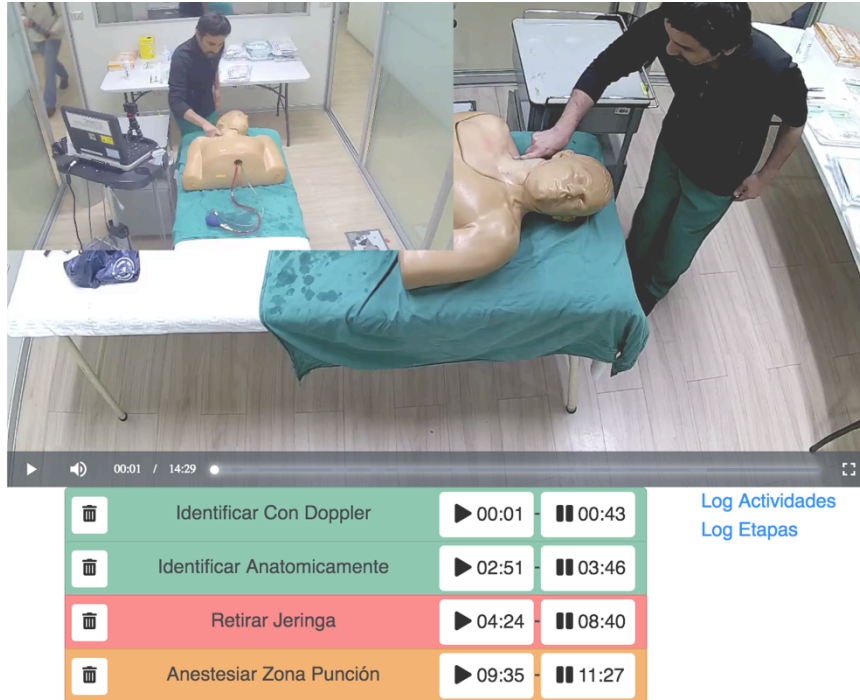
A special software was designed to tag the videos with the activity performed, and their initial and final times.

The challenge contains the log in **CVS** notation, **XES** notation, and **XLSX** notation.

2 Perspectives

Since there is a pre-defined model of the procedure, and a log with the PRE and POST executions, one could consider it a perfect case for a **conformance** checking analysis.

Since it is an interdisciplinary scenario, any conformance analysis and results should be interpretable and **understandable** enough for such audience.

Moreover, the analysis must include **2 perspectives**, one for each stakeholder (students and instructors):

Students: Interested on their own performance and their specific mistakes

Instructors: Interested on an aggregated analysis of the whole course