

# 6 | SERIOUS GAME TO EXPLORE DECISION-MAKING BY TRIAGE NURSES IN A STRESSFUL ENVIRONMENT

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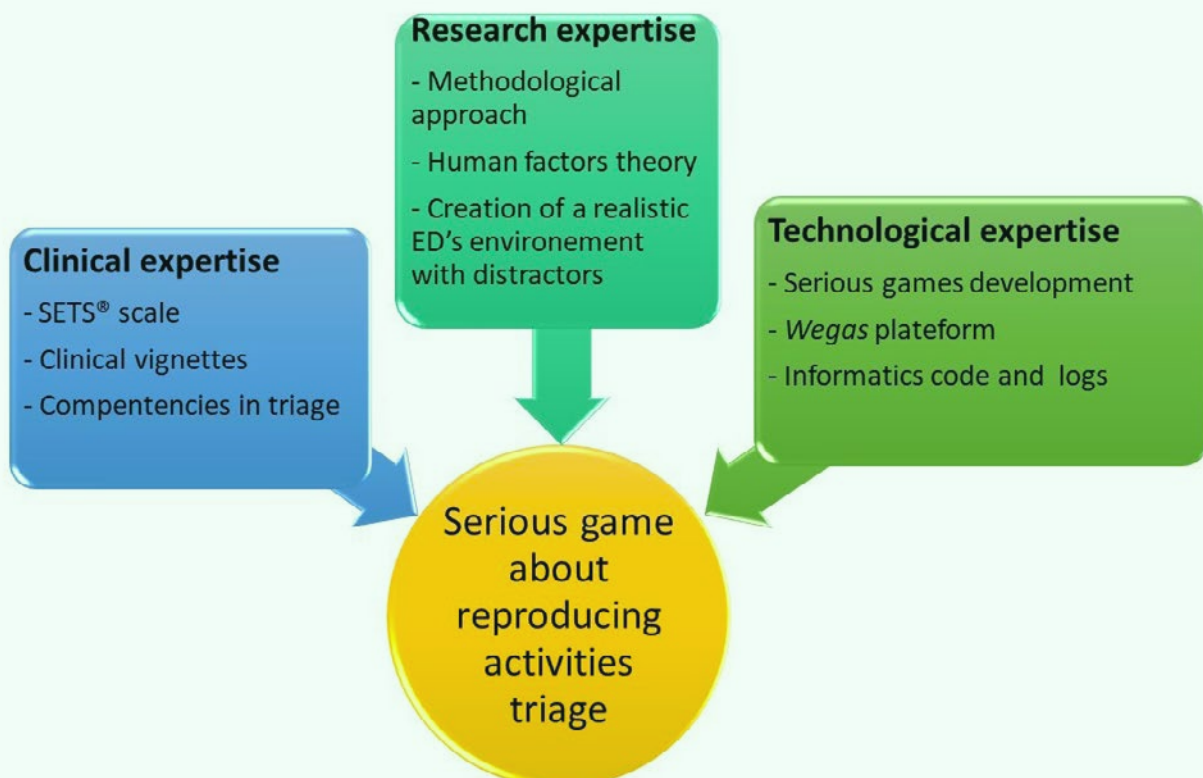
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## ABSTRACT

Clinical judgment and decision making are critical components of the nurse function in emergency departments (ED), and more specifically in the field of triage [1]. In order to test the influence of stressors on triage quality, we developed a serious game to reproduce real work conditions in an ED setting. The aim of this first study is to evaluate this serious game feasibility and acceptability. Further research is planned to use the serious game to measure nurses' emotions during triage.

## KEYWORDS

Decision-making, triage, emergency, nurse, serious game.





## CONTEXT

Triage is one of the most important steps in patient admission in emergency departments. Triage decisions have an impact on patients' health and on the use of ED resources and organization [2]. To our knowledge, there is no scientific data on a serious game giving a dynamic approach using 2D patients with clinical written vignettes in an interactive ED environment. Previous research studies on triage evaluation have been conducted with written clinical vignettes, an observational approach or a basic simulator that limits the reproducibility and realism of the triage process [3, 4]. The creation of our serious game was a collaboration between different partners including the School of Engineering and Management (HEIG-VD), La Source (School of nursing), the University of Applied Sciences and Arts Western Switzerland (HES-SO), HESAV-University of Health Sciences the University of Applied Sciences and Arts Western Switzerland (HES-SO) and clinical experts from the Geneva University Hospital and the Lausanne University Hospital, both partners of the Swiss Emergency Triage Scale (SETS®) group (See image above).

## TARGETED ISSUES

Triage activities rely on a complex clinical reasoning process. In 12 hours, a triage nurse assesses the severity of 80 patients, and makes several decisions for each of them. Currently, nurse's training in triage differs in the number of training hours as well as in the training methods, which include direct coaching and vignette-based learning. Serious games are an innovative approach in educational health training. Our serious game revolves around the following main objectives:

- › Analysing decision-making in a realistic triage zone
- › Assessing the emergency level degree chosen by the triage nurse on each clinical vignette
- › Rating this serious game acceptability in an emergency nurse population

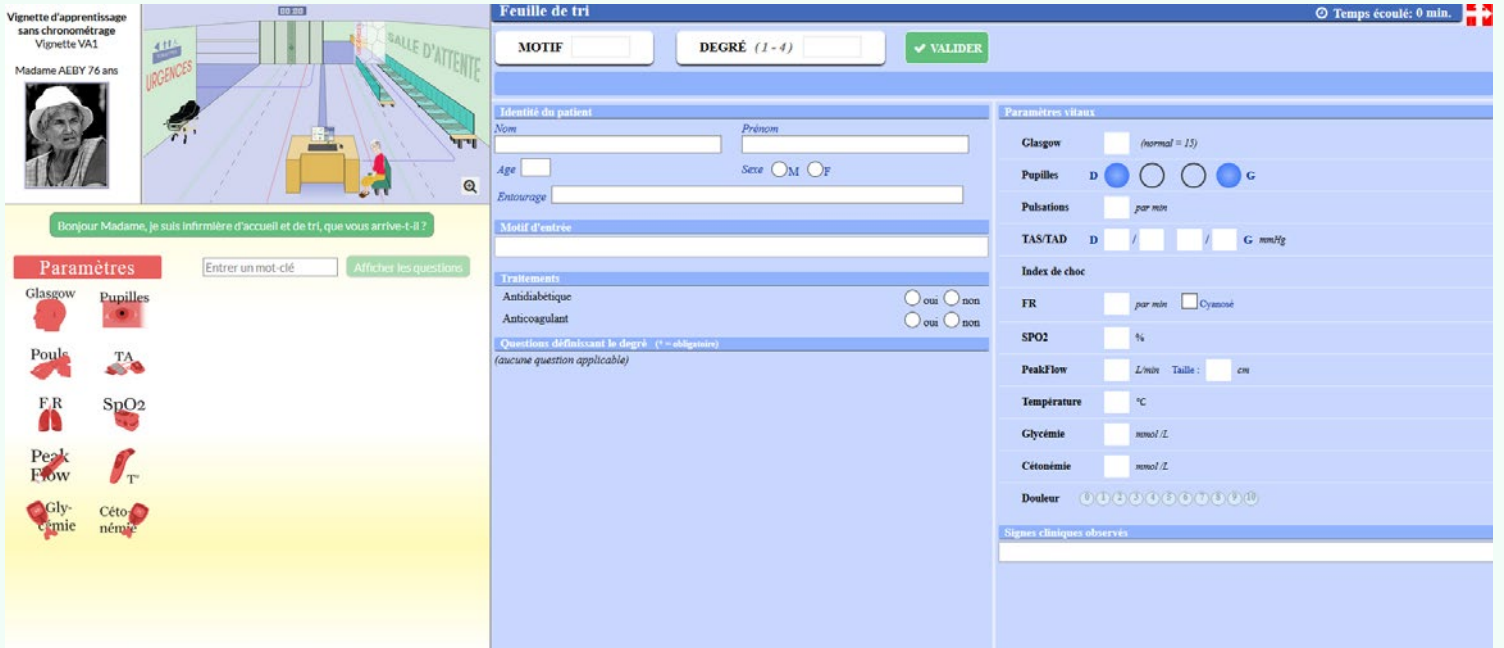
*This serious game offers  
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reproducing triage activities*



This work will report the different triage activities that we reproduced in this serious game, like reporting present illness history, collecting vital sign measurements or using SETS® specific criteria. We also describe technical features like sound effects, task interruptions and triage zone design.

## PROPOSED SOLUTION

Triage is a dynamic activity based on patient-nurse interactions. To reproduce this activity, we started from a basic interactive simulator based on simple questions-answers interactions that included 30 clinical vignettes [5, 6]. This was our first prototype. To create a more realistic simulator, we added a dynamic 2D virtual environment replicating an ED waiting room. We created 20 clinical vignettes whose accuracy and consistency were tested by nurse experts. We added 20 2D figures reproducing patient's arrival in emergency by ambulance or wheelchair. We modeled 10 interruption tasks and 10 sound effects representing distractors frequently present in an ED: They were programmed to interfere with specific tasks like anamnesis or vital sign measurement. The serious game records the questions from nurse's anamnesis (See image below), vital sign transcription, the chosen level of emergency and listing of patient complaints according to the SETS®. The serious game is hosted on the Wegas platform developed by AlbaSim (www.albasim.ch), which is the "serious game" research axis of the Media Engineering Institute at the HES-SO.



## RELEVANT INNOVATION

This serious game offers a realistic immersion, reproducing triage activities like different mode of patient arrival i.e. ambulance transport, sounds and task interruption. Triage process could be reproduced using classical simulation with standardized patients or high-fidelity mannikins. Both solutions are very costly and difficult to integrate in a resource strained ED environment. Our approach is innovative, light and easy to use. Also, it proposes a valid alternative to initiate nurses to their triage function. This serious game is a valid tool to evaluate nurses' performance before exposing them to triage real conditions. Currently, there are numerous EDs using the SETS® in the French-speaking part of Switzerland. Our serious game also allows to analyze the performance between diverse EDs triage comparing different results like needs in nurse's triage training. Furthermore, it can be reprogrammed to customize the content for the junior year of nursing bachelor program when students learn the basis of patient anamnesis.

## PROJECT OUTCOMES & RESULTS

Our serious game was tested in a group of 80 triage nurses recruited in six Swiss EDs. Its main outcomes were to evaluate the serious game feasibility and acceptability:

- › the serious game qualities were measured with the AttrakDiff® scale [7].
- › the serious game realism was rated using a visual analogic scale, where the nurse evaluates the perception of the realistic reproduction of triage activities.
- › the research team used a research diary to note all technical issues which happened while the nurses played the serious game on a laptop.

## CONCLUSION

This serious game is an innovative product to train triage nurses and improve their performance and the quality of the entire triage process, i.e. the accuracy of emergency level and patient complaints. Further research is planned to measure emotions like stress perception or clinical reasoning analysis. This is a first step to explore and analyze complex triage activities.

## PERSPECTIVES & NEEDS

To further evaluate our serious game possibilities, it is necessary to improve this first version by introducing stressors or adding other triage activities like waiting room management. A nursing doctoral thesis on measuring stress in triage nurses is being carried out. This serious game can also become a valuable tool for teachers and to improve quality in emergency departments. Its implementation with longitudinal measures in emergency departments can be proposed to emergency nurses' managers.

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