

Simulación y práctica: una perspectiva de mediciones repetidas

Simulation and practice: a repeated measurements perspective

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Resumen: La simulación puede brindar oportunidades poderosas para el desarrollo de habilidades esenciales, en un entorno seguro que no tiene consecuencias para los pacientes. Sin embargo, para comprender los efectos de la simulación en la práctica clínica, necesitamos un diseño que nos permita medir sistemáticamente una o más variables de interés, repetidamente durante y después de la simulación y, cuando sea posible, también antes de la simulación. Aunque este tipo de investigación a menudo se asocia con muestras más grandes de participantes, a través de un ejemplo simulado este artículo demuestra que este tipo de diseño se puede utilizar incluso en entornos donde solo hay un participante. Un uso más frecuente de este tipo de diseño puede ayudarnos a comprender los efectos de la simulación en la práctica a corto y largo plazo y cómo estos efectos dependen del contexto en el que se lleva a cabo la simulación.

Palabras clave: simulación; investigación; actores; pacientes; mediciones repetidas

Abstract: Simulation can provide powerful opportunities for the development of essential skills in a safe environment that has no consequences for patients. However, to understand the effects of simulation on clinical practice, we need a design that allows us to systematically measure one or more variables of interest repeatedly during and after the simulation and where possible also before the simulation. Although this kind of research is often associated with larger samples of participants, through a simulated example this article demonstrates that this type of design can be used even in settings where there is only one participant. An increased use of this kind of design may help us to understand the effects of simulation on practice on the short and long term and how these effects may depend on the context in which simulation takes place.

Keywords: simulation; research; actors; patients; repeated measurements

1. Introduction

Most research in simulation focuses on its effectiveness in achieving training goals, such as improving technical skills, communication, and/or relationships. Although single-occasion measurements and interviews with groups of participants are common methods, less known are research designs to understand short- and long-term effects of simulation through repeated measurements during, after and possibly also before a simulation. These designs are called *single case designs* (SCDs) or, where measuring starts before the simulation and the timing of

the simulation is randomized, *single case experimental designs* (SCEDs), and they can be used even for only one participant (1-3). This article provides a hypothetical example of an SCD.

2. Method

Clinician C is the preceptor of one resident (B) in her specialty. She undergoes a seven-week tutoring/preceptor skills simulation-based training aimed at improving relationships, with one roleplay session with actor A at the end of every week. Resident B does not know about the training. As part of the tutoring/preceptor program, B completes at the end of each week during and after the training a very short questionnaire about C as a tutor, including one question to rate the quality of the perceived C-B relationship on an integer scale from 1 (*very bad*) to 10 (*excellent*). B provides fourteen ratings of that question, seven during and seven after the training. With series of at least five ratings during and after the training, the data can be analyzed with regression models for SC(E)Ds (1, 3) using the *nlme* package (4) in the zero-cost Open-Source program R (5).

3. Results

Figure 1 presents the ratings (in blue) and the best fitting model (in red).

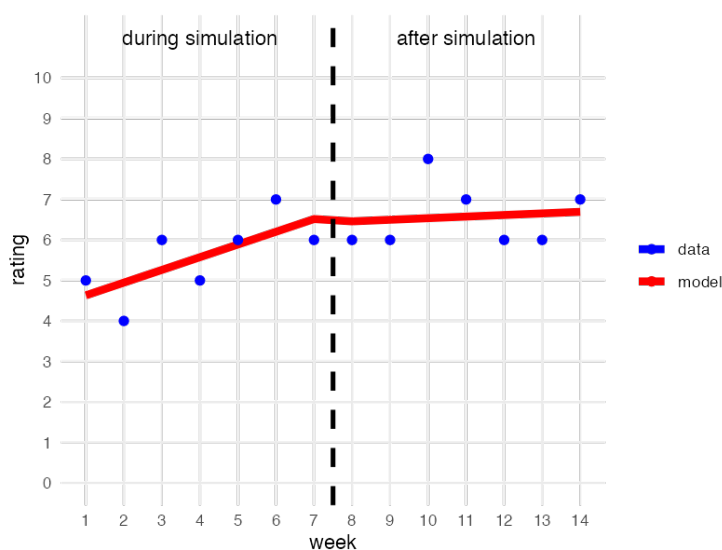


Figure 1. Resident B's fourteen ratings of the C-B relationship (data, blue dots) and a moving average model (red line).

Following a clear increase in ratings during the simulation, there is a statistically non-significant increasing trend after the simulation: $B = 0.177$, $SE = 0.835$, $p = 0.836$, $95\% \text{ CI} = [-1.682; 2.037]$.

4. Discussion

The trajectory in **Figure 1** provides no evidence of a declining trend (loss) after the training, which is reassuring. If C had more residents, the ratings of those residents could be analyzed separately and/or combined into a meta-analysis (3), and that also applies to studies including multiple tutors/preceptors, multiple centers and/or multiple outcome variables within the same tutor(s)/preceptor(s)

or center(s). Further, although the outcome in this example is quantitative, models for dichotomous (e.g., yes/no) and other categorical (e.g., poor/satisfactory/excellent) outcomes also exist (2-3). Finally, in settings where we have a series of measurements before the start of the training as well, the design and statistical model are extended accordingly, and other extensions exist for more complex situations including multiple interventions or long-term follow up. As such, SC(E)Ds constitute a powerful tool to investigate the impact of training on practice in centers and organizations.

5. Conclusion

Single Case Experimental Designs,

- focus on individual change during, after, and possibly before a training.
- can help us to understand immediate and longer-term effects of a training, and
- can be applied to groups as well as to the individual.

Material suplementario: none

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