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Featured Article

# Self-Learning Methodology in Simulated Environments (MAES<sup>©</sup>): Elements and Characteristics

José Luis Díaz, RN, PhD (Social and Health Sciences)<sup>a,\*</sup>,  
César Leal, RN, PhD (Psychology)<sup>a</sup>, Juan Antonio García, RN, PhD (Psychology)<sup>a</sup>,  
Encarna Hernández, RN<sup>b</sup>, María Gracia Adánez, PhD<sup>c</sup>, Antonia Sáez, RN<sup>a</sup>

<sup>a</sup>Catholic University of Murcia, Guadalupe, Murcia, Spain

<sup>b</sup>Midwife, Catholic University of Murcia, Guadalupe, Murcia, Spain

<sup>c</sup>Physician, Catholic University of Murcia, Guadalupe, Murcia, Spain

## KEYWORDS

self-learning;  
nursing education;  
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MAES methodology;  
peer education

**Abstract:** The features and pedagogical foundations of self-learning methodology in simulated environments (MAES) are discussed in this article. MAES has six elements (team selection and creation of group identity, voluntary choice of subject of study, establishment of baseline and programming skills to be acquired through brainstorming, design of a clinical simulation scenario in which the students practice the skills to be acquired, execution of the simulated clinical experience, and finally debriefing and presentation of the acquired skills) that develop sequentially to achieve a high level of skills acquisition by students working in teams. The students direct their learning, design simulation scenarios, and discuss the outcomes and related scientific evidence under the guidance of a facilitator.

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Clinical simulation provides a highly realistic experiential and reflective learning opportunity that is becoming more prevalent worldwide in the training of health professionals. Its benefits have been argued on many occasions, especially in relation to the acquisition of skills and improvement of patient safety, and today, it is generally acknowledged that clinical simulation not only

complements actual clinical practice but could also replace up to 50% of in-person clinical training if properly implemented (Alexander et al., 2015).

Traditional simulation-based learning (SBL) casts the facilitator of the simulation or the responsible teacher of a particular subject as the person responsible for designing scenarios for students to perform, thereby enabling students to apply skills and knowledge.

The strategies for conducting appropriate simulations have been amply documented and involve the correct preparation of the simulated scenarios (Lioce et al., 2015). Predesigned scenarios can also be obtained through

MAES is a Spanish acronym of "Metodología de Autoaprendizaje en Entornos Simulados."

\* Corresponding author: [jluis@ucam.edu](mailto:jluis@ucam.edu) (José L. Díaz).

specialist literature to create clinical scenarios that teach specific skills (Campbell & Daley, 2013).

Although clinical SBL is considered experiential and reflective, it is still managed and predetermined by an expert (usually a teacher or facilitator) who provides tutoring that helps students acquire the necessary knowledge, skills, and attitudes.

### Key Points

- MAES was developed by a research group at the Catholic University of Murcia.
- Key elements in MAES are group work, students' motivations and group identity and confidence.
- MAES maps to the INACSL standards for simulation.

The creation and design of the MAES methodology (Spanish acronym for "Self-Learning Methodology in Simulated Environments") was inspired by the idea of student-led learning, principally the idea of increasing students' motivation by empowering their role in the simulation through the establishment of autonomous work teams

that work through clinical simulations in an apparently self-directed way.

MAES was conceived thanks to the synergistic coexistence of several pedagogical ingredients: self-directed learning, problem-based learning (PBL), simulated clinical experience, and peer education. The advantages of peer education have been documented in some studies (Keller, Frank-Bader, Ascalon, & Bowar-Farres, 2011; Ramm, Thomson, & Jackson, 2015), although it has been fundamentally challenged because of factors related to students' lack of clinical experience from which to teach each other. This problem could be overcome by increasing student motivation, empowering them, and stimulating their knowledge competences with the use of high-quality evidence in the design, implementation, and discussion of clinical simulation scenarios. In this regard, MAES (Díaz, Leal, & García, 2014) involves working with teams of students united by a strong group identity, provides independence in selecting the topic of discussion in the simulation, helps students to set learning objectives and design a simulation scenario, and also requires students to present current scientific evidence related to the designed and executed clinical scenario.

## Background and Context

MAES was developed within the research group Aprendizaje en Entornos Clínicos Reales y Simulados (AECRESI) (Spanish acronym for "Learning Environments: Clinical, Real and Simulated") of the Catholic University of Murcia (UCAM). It has been used in the Clinical Practicum IV and Clinical Practicum VI for 4th-year nursing students since 2012.

The creators of MAES have >5 years of experience as facilitators in clinical simulation (Leal, Diaz, Rojo,

Juguera, & López, 2014) and have accumulated >200 hours of simulation annually with 4th-year nursing students and >4 years of teaching experience with PBL (Díaz & Díaz, 2009) at the Faculty of Nursing at the UCAM. One of the fundamental pillars on which MAES rests is the use of PBL processes, which allows the student to identify his or her learning needs to better understand the problem under investigation, identify the principles underpinning knowledge, and meet learning objectives related to each portion of the educational program.

SBL and PBL have been described in the literature (Gaba & DeAnda, 1988; Hmelo-Silver, 2004; Rosen et al., 2008) and have a long history of use in tertiary education in nursing and medicine at the international level.

Some variants of the use of learning problems with simulated scenarios in nursing training have been recently described (Clark, Ahten, & Macy, 2013; Murphy, Hartigan, Walshe, Flynn, & O'Brien, 2011; Walshe, O'Brien, Murphy, & Hartigan, 2013). MAES, however, represents a new methodological approach that goes beyond the simple preparation and implementation of a learning scenario simulated by the student. Self-directed learning on which MAES is based enables students to reflect on their previous knowledge and enlighten them as to their competency gaps, thereby forcing them to seek information, design a scenario that will be implemented by another team of students, and finally discuss the simulated experience to achieve the set objectives.

The simulation at the UCAM is structured with clinical practicums and is not a separate subject; it is not grouped with theory-based classes but is instead closely linked to the real clinical practice that the students undertake (Leal et al., 2014). Thus, if a student is gaining work experience in a hospital's intensive care unit, he will perform simulations, previously or subsequently, with critical patient scenarios at the university. Similarly, if the students work in an oncology unit, they will participate in simulations with cancer patient scenarios. The MAES methodology has only been implemented in selected simulations for the 4th-year nursing students; the rest of the simulations mandated by the curriculum is guided by facilitators and designed according to the learning objectives that are to be acquired by the students.

The process of working with the self-learning methodology in simulated environments is fully explained in the following sections.

## Elements and Features of the MAES Methodology

### Choice of Teams and Establishment of Group Identity (First MAES Session)

One of the key elements of MAES is the empowerment of group work, which facilitates students' motivation through the development of a group identity and confidence.

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