Learning by simulation - an educational experience in the simulation center of the school of medicine of the University of Navarre

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Abstract

The purpose of this paper is to show how students from their freshman year acquired, through teaching by simulation, the principles of those skills needed for a better development of their subsequent professional practice. It is well-known that with the education provided in the Medical Simulation Center, learning takes place in an integrated and updated manner, with the creation of learning scenarios in which the level of similarity with reality is extraordinary. In our medical school students develop multiple activities in the simulation center from their first year of medical studies in the course “Initiation in Clinical Procedures”. It is a very rewarding experience that offers valuable opportunities to carry out pedagogical studies. If we want students to assume the role of protagonists in their own education, we teachers need to develop a teaching style that promotes this attitude of active participation in our students in, while directing and guiding them in this journey. Based upon the experience obtained over the past three years with the students of our department, who from the first to the sixth year of their medical studies have participated in various training activities and practices developed in our Simulation Center, we have concluded that the acquisition of certain skills and training in certain specific areas of teaching competence becomes a requirement for the instructor and is the key to a teaching-learning process that is effective, of the highest quality and that clearly an correctly integrates an academic and / or scientific formation with the training of future medical staff. © 2011 Published by Elsevier Ltd.

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1. Introduction

"The use of simulators in medical education is not intended to replace the student's contact with the patient but to prepare the him or her adequately for their encounter with reality, giving greater security and skill in carrying out clinical procedures on their patients" (Lavalle & Leyva, 2011, 5). From this perspective, a simulator is a means by which to recreate and reproduce a phenomenon to be explained to the student. Thus the student has the opportunity to interact creatively with a simulated model, exposure to real clinical situations and gain from this interaction, knowledge and appropriate skills (Chipman & Schmitz, 2009, Gardner & MSAR, 2008).

The instructor finds in the simulator a tool that permits the creation of a rich educational environment with which greater teaching progress can be made because, following the demonstration, students proceed to do the exercises under direct supervision and the cycle of “correction and advance” is immediate and continuous (Wakisaka, 2009). Sometimes the simulation will be carried out with a simulator, at other times it will be a fellow

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student or a standardized patient. These resources, which the instructor has at his disposal, will greatly facilitate his task since the process of the integration of conceptual, procedural and attitudinal knowledge essential for the student is attained at a high level in the development of experimentation in this context, or a learning scenario is recreated in the Medical Simulation Center (MSC hereafter). In addition, the degree of difficulty of the activities in this context can be easily adjusted and adapted to the progress of students. We discover a new world for the teacher, for the student and for teaching at the university (UNESCO, 1998).

2. The Project

The inefficiency of the training model that has been employed until recently is evidenced by the lack of connection between universities and health care units (workplaces), as reflected in the following aspects (Lavalle & Leyva, 2011, 3):

- Graduates do not have the skills required in hospitals, so they need to continue their learning with training and professional updating.
- Dissociation between knowledge and skills.
- Lack of relevance of the material taught in universities (emphasis on the disciplinary and encyclopedic knowledge.)
- Little knowledge about the components of effective caregiver job performance.

This deficiency shows that the activities in the CSM are essential to making a precise selection of objectives with regard to the knowledge, skills and attitudes to be acquired in the study of medicine, so that the training activities and the use of this resource may be programmed with consistency and accuracy, thereby better serving the learning process of our students. The selection of objectives to be achieved by the use of the Center fully affects the approach or methodology to be followed by the teacher and the approach to evaluation, i.e., how to review and evaluate the student's performance in each experience and to what degree the knowledge and competence set out in the objectives has been attained. The goal is the development of a competency-based education (Diaz-Barriga, 2006) that aims to:

- link the educational system with the reality of daily medical care
- Build a comprehensive training system that in its fundamental design connects the world of work with the educational environment
- Build new areas of knowledge that allow adaptation to new circumstances.

Two key tasks will require the teacher to prepare his or her activities: the first, the gradation of the skill or competence acquired, which is one of the most difficult for the teacher. Although extensive professional experience can help define the gradation, the decisive factor in successfully carrying out this task is to first set the goals we want to achieve and planning the activities that are to follow. Ultimately the goal is to specifically and precisely respond to to several questions: what do I want my students to learn? What do I as an instructor have to do to achieve this? What exactly do my students have to do to achieve it? etc. Evidently, in the course of this reflective process we will have to decide and very concretely define what we consider a high, medium or poor command of the skill sought. This preliminary work by the teacher also facilitates the creation of a way of making an environment conducive to student learning and the possibility of providing steady and adequate feedback to students.

The other task that makes the teacher training project more effective is understanding and manipulating the mannequin or the simulator to its full potential. This is a difficult task because modern technology, despite being quite intuitive, requires some skill in the use of devices that incorporate software packages and "interfaces" that are more or less complex, with all their connections and quirks. The instructor should therefore spend some time learning and mastering as completely as possible, the use of the simulator and all of its possibilities.

The teacher must allow and encourage participation and initiative in their students’ performance, taking care to ensure that the use of such materials, as expensive as they are valuable in their educational effectiveness, is appropriate for better evaluating the resources their disposal. Effective workgroup dynamics is an essential component of collaboration (Poole & al. 1993; Hogg & Abrams, 1993).
3. Degree Students in the Simulation Center

With the aim of encouraging students to begin to incorporate the competencies and skills needed for better development of their professional practice in the future from the first year of their studies (Epstein & Hundert, 2002; Lie, 2006), a simulated reality is created in the MSC in order to stimulate learning. Although there is effectively a large amount of literature on the relevance of team competencies, not many learning solutions exist today to address the domain of collaboration competencies (Euler, 2004).

We know that in the education provided at the Medical Simulation Center, learning becomes integrated, updated and meaningful through the creation of learning scenarios in which the level of similarity with reality is extraordinary. The environment of the laboratory and simulation modes allow students to learn from mistakes in a safe environment, while in the clinic these may result in actual harm to patients (Peyton, 1998). In our medical school we have chosen because all of our students, from first year students in the course "Initiation in Clinical Procedures" to the students in the final year of medical studies in specific seminars, participate in numerous workshops in the Center for Medical Simulation.

A number of valid insights can be gained from current practices and experiences with current pedagogical approaches aimed at developing at least one of the competencies related to effective collaboration, providing learning experiences for instance in the areas of Knowledge Management (Scardamalia & Bereiter, 1994), social competencies and social networks (Williams, 2002), group dynamics, or e-collaboration (Gibson & Cohen, 2003; Mayrhofer & Back, 2003).

It is a rewarding experience that provides us with very important evaluations from the pedagogical point of view about how the student acts in this quasi-real context in which he or she assumes the roles assigned by the instructor (Nestel, 2007). For students to take responsibility and assume the lead in the process of their own learning, teachers by their attitude need to promote action, and to guide and encourage them to participate and progress by assimilating new knowledge.

4. Student activities

By way of example, we identify below some of the practices in the course "Initiation in Clinical Procedures" carried out with first-year medical students in the CSM. These students excel in learning skills:

- Intramuscular injection and subcutaneous administration in mannequins.
- Basic CPR in the “Resusci Anne Skills Station” simulator.
- Neurological exploration in peers.
- Writing of medical records with standardized patients.
- Basic cardiac and pulmonary auscultation in the ALS simulator.
- Taking blood pressure among classmates and in the simulator.
- Extraction of blood in the simulator.
- Immobilization in Traumatology.
- Skin sutures in simulators.
- Surgical washing the simulated surgical theater.

Similarly, students in the second to sixth courses are required to take mandatory electives or specific seminars. Highlights include:

- Peripheral and Central Venous Pathways
- Ultrasonography in vascular approaches.
- Manual artificial ventilation.
- Basic monitoring. Monitoring of artificial respiration.
• Loco regional anesthesia.
• Techniques for lumbar punctures and epidural anesthesia on mannequins.
• Sutures and skin knottings on skin simulators.
• IUC on mannequins.
• Infusion systems. Management of the hammer and infusion pump.
• Cardiological exploration with the “HARVEY” simulator.
• CPR and advanced life support, etc., depending on the courses.

Students in the fifth and sixth year of Medicine specifically dedicate weeks of preparation for the OSCE examination (Objective Structured Clinical Evaluation), in which students perform practical internships assisted by tutors—classmates who have received specific training prior to each workshop. The student-tutors themselves confirm that we know well what we can teach.

5. Necessary Teaching Skills

With this type of activity the students realize that their practices are developed in an environment of trust, security and good humor. Everything that happens in the practice workshops is almost continuously permeated by good humor, and this is because when promoting the continued participation in the students, error is part of a student’s performance and within the group this generates an attitude of acceptance because all the participants share similar moments of nervousness, typical of those taking their first steps in these activities and which make us so vulnerable to error. In the CSM, we do not avoid errors ... we provoke them! (Housman, 2009). We regard humor as a characteristic of the activities that take place in the CSM. The university has found in the CSM a source of motivation of great significance, generating great interest in knowing, participating and developing multiple activities in our classrooms.

Simulation is not new as an educational methodology for teaching, but it is an innovation that is integrated into the undergraduate curriculum by offering the latest methods of medical simulation, accompanied by the video and audio support technology needed to consolidate the learning that takes place in each session held at the Center; thanks to this, the "debriefing" (Julie, 2010) or posterior reflection between students and teachers is more effective and therefore more formative. Evaluating how a student’s performance has developed from the different dimensions of influence (the technical and relational perspectives, the group's communication style, leadership or problem solving, among others) facilitates self-reflection and an understanding of both the errors committed and the corrections that each has received in the course of the practice session, and which they perhaps had not been alerted to at the time they made them.

Reflection and the concretion of the objectives pursued at each stage of learning, as well as the assessment of the way or the extent to which they have been achieved are key for the teacher. It is also very important to consider the views that students provide on the adequacy, consistency and degree of difficulty encountered in the activity, the use of available resources, the amount of time required for each practice session and, of course, the supports or additional help they have found in the course of carrying out the task. The evaluation of teaching performance helps detect both errors or weaknesses as well as successes and strengths, allowing the introduction of appropriate changes in the training project with a view to improving future sessions; evaluation and reflection on teaching practice are two inevitable questions when it comes to teacher training and educational innovation.

The fundamental teaching skills that we value, from the experience gained in our Simulation Center, combine the following characteristics:
SKILLS AND COMPETENCIES

TEACHERS
- Consolidate theoretical, technical and practical knowledge of the area being taught.
- Knowledge of the possibilities and the acquisition of skills required for the use of the simulator.
- Prior planning and scheduling of the activity, establishing objectives, sequencing of the activity and its evaluation.
- Clarify the method used for evaluation.
- Contextualizing the practice with cases, names or events that serve as a "entraining" in student learning.

PERSONAL
- Good humor in his or her teaching style and the ability to provide feedback that enables students to build confidence without sacrificing standards.
- Encourage student participation without being intrusive and facilitating reflection and opinion in the "debriefing" after the activity.
- Correct with positive reinforcement in each case and emphasize the learning objectives.
- Maintain an attitude of proximity and accessibility in order to address questions or concerns.
- Activate the student's ability to relate and integrate concepts and facts by stimulating their participation and reflection.

Conclusion

From all this we conclude that the development of appropriate teaching skills (Zabala, 2007) is the key to learning, so that in a simulator scenario the highest levels of quality and training effectiveness can be achieved. In this sense, the project that has been submitted shows that learning by simulation makes it easier for medical students to enter the workplace with better preparation and adjustment.

Education is an art and teaching supported by a simulation center for is an educational innovation; not so much because it is a commitment to renewal, which it also can be, but because it tries to improve on something in the line in which the Medical School had already been working at the university. Ultimately it is betting on continued growth and improvement rather than introducing something completely new and different (Zabalza 2003-2004).

All the effort required to prepare teaching-learning scenarios and practice sessions are offset by the motivated attitude of students who strive for and acquire a deep and solid awareness, who retain what they have learned more easily, and who are capable of integrating and relating it to developments in other fields or areas of knowledge in their subsequent courses of study. The result of all this is that it accomplishes the primary objective of the training of our faculty: to train people capable of caring for their patients as people who are sick and not just as living organisms that are sick, and, as a result of this education and/or this way of practicing their professions, to provide greater security, trust and confidence in the patient (Scott, 2010).

References


Lie, Desiree (2006) “Using the Tool for Assessing Cultural Competence Training (TACCT) to Measure Faculty and Medical Student Perceptions of Cultural Competence Instruction in the First Three Years of the Curriculum” Academic Medicine, 81 (6), 557-564.


Scott, S (2010) “Simulation Promotes Patient Safety” Advances in Nursing, June 11,


[http://dialnet.unirioja.es/servlet/articulo?codigo=1049473