

## Constructed meanings of clinical simulation practices by nursing students

### Significados construidos de las prácticas en simulación clínica por estudiantes de enfermería

### Significados construidos da práticas em simulação clínica por estudantes de enfermagem

*María Cristina Reyes Martínez*<sup>1</sup>, ORCID 0000-0002-0352-9423

*Juan Mansilla Sepúlveda*<sup>2</sup>, ORCID 0000-0001-8175-7475

*Gina Muñoz Gámbaro*<sup>3</sup>, ORCID 0000-0001-6428-1874

*Mónica Robles Jélvez*<sup>4</sup>, ORCID 0000-0001-9915-2968

<sup>1 3 4</sup> *Escuela de Enfermería, Facultad de Ciencias, Universidad Mayor. Chile*

<sup>2</sup> *Universidad Católica de Temuco. Chile*

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**Abstract:** Objective: To describe the meanings that nursing students have built from clinical simulation experience to meet their learning needs. Methodology: The descriptive qualitative study from a hermeneutic paradigm. The design corresponds to an instrumental case study. A focus group and in-depth interviews were applied to 5th year students of the nursing career of Universidad Mayor Temuco, Chile, 2015. Data reduction was done from Atlas Ti software, version 7.0. The transcription of verbal data was developed from Jefferson transcription convention, which allowed the development of codification processes and analysis of narratives. Results: 4 categories emerged: Characteristics of clinical simulation, training expectations of clinical simulation, mobilized competencies and the importance of simulation for clinical practice. Within the observed results, students recognize that clinical simulation provides a safe and risk-free environment, they can integrate what they have learned in theory, into practice, without fear of causing harm to patients, being able to make mistakes, therefore, achieving meaningful learning. In addition, it allows the development of competencies such as teamwork, effective communication, problem solving, stress management and leadership. All this improves the confidence and safety of the student when facing real patients, promoting the delivery of quality nursing care, safeguarding the safety of users. Conclusion: Students value clinical simulation from a technical and personal perspective as a learning methodology that facilitates integration between theory and practice, promoting patient safety, self-confidence and security in the student.

**Keywords:** Simulation; Nursing Education; Patient Safety; Learning

**Resumen:** Objetivo: Describir los significados que han construido los estudiantes de enfermería a partir de la experiencia en simulación clínica para satisfacer sus necesidades de aprendizaje. Metodología: La metodología es cualitativa descriptiva, desde un paradigma hermenéutico. El diseño corresponde a un estudio de casos de tipo instrumental. Se aplicó un grupo focal y entrevistas en profundidad a estudiantes de 5° año de la carrera de enfermería de la Universidad Mayor Temuco, Chile, año 2015. La reducción de datos se hizo desde el software Atlas Ti, versión 7.0. La transcripción de la data verbal se desarrolló a partir del convencionalismo de Jefferson, lo que permitió el desarrollar procesos de codificación y análisis de narrativas. Resultados: Surgieron 4 categorías: Características de la simulación clínica, expectativas formativas simulación clínica, competencias movilizadas e importancia de la simulación para la práctica clínica. Dentro de los resultados observados, los estudiantes reconocen que la simulación clínica proporciona un entorno seguro y libre de riesgos, pueden integrar lo aprendido en la teoría a la práctica, sin temor de causar daño a los pacientes, pudiendo cometer errores, logrando así un aprendizaje significativo. Además, permite el desarrollo de competencias como trabajo en equipo, comunicación efectiva, resolución de problemas, manejo del estrés y liderazgo. Todo esto mejora la confianza y seguridad del estudiante al momento de enfrentarse al paciente real, promoviendo la entrega de cuidados enfermeros de calidad, resguardando la seguridad de los usuarios. Conclusión: Los estudiantes valoran desde una perspectiva técnica y personal la simulación clínica como una metodología de aprendizaje que facilita la integración entre teoría y práctica, promoviendo la seguridad del paciente, la autoconfianza y seguridad en el estudiante.

**Palabras clave:** Simulación; Educación en Enfermería; seguridad del paciente; aprendizaje

**Resumo:** Objetivo: Descrever os significados que os estudantes de enfermagem construíram a partir da experiência em simulação clínica para atender as suas necessidades de aprendizagem. Metodologia: Estudo descritivo qualitativo a partir de um paradigma hermenéutico. O design corresponde a um estudo de caso do tipo instrumental. Um grupo focal e entrevistas em profundidade foram aplicados aos alunos do quinto ano da carreira de enfermagem na Universidad Mayor Temuco, Chile, 2015. A redução de dados foi feita a partir do software Atlas Ti, versão 7.0. A transcrição de dados verbais foi desenvolvida a partir do convencionalismo de Jefferson, o que permitiu o desenvolvimento de processos de codificação e análise de narrativas. Resultados: Emergiram quatro categorias: Características da simulação clínica, expectativas formativas, simulação clínica, competências mobilizadas e importância da simulação para a prática clínica. Dentro dos resultados observados, os estudantes reconhecem que a simulação clínica proporciona um ambiente seguro e livre de riscos, eles podem integrar o que aprenderam na teoria à prática, sem medo de causar danos aos pacientes, sendo capazes de cometer erros, alcançando assim a aprendizagem. significativo Também permite o desenvolvimento de habilidades como trabalho em equipe, comunicação eficaz, resolução de problemas, gerenciamento de estresse e liderança. Tudo isso melhora a confiança e a segurança do aluno frente ao paciente real, promovendo a entrega de cuidados de enfermagem de qualidade, resguardando a segurança dos usuários. Conclusão: Os estudantes valorizam, de uma perspectiva técnica e pessoal, a simulação clínica como metodologia de aprendizagem que facilita a integração entre teoria e prática, promovendo a segurança do doente, a autoconfiança e a segurança no estudante.

**Palavras-chave:** Simulação; Educação em Enfermagem; segurança do paciente; aprendizagem

## Introduction

The pedagogical practices in simulation have demonstrated their effectiveness in multiple fields and areas of the health sciences. Simulation is an exercise in didactic transposition of disciplinary contents and allows the generation of a clinical learning context, which is a formative environment where students apply theory to practice, acquire critical thinking skills, participate in clinical decision making, and practice psychomotor and affective skills (1). Student's perception of learning influence how the student will participate in the clinical learning experience and emphasizes the importance of the consistency between teaching and learning for the achievement of clinical education goals; this is a challenge for the training of nurses, i.e. student performance is more complex in the simulated environment than in the traditional classroom (2). However, simulation practices have significantly increased and the confidence in this metacognitive teaching-learning strategy (3,4).

It has been proved that using simulations achieves better specific topic- and discipline knowledge, improves communication and teamwork, enhances certain ability development, and reduces stress during procedures. Even, it has been shown an improvement in certain clinical results (5). For some perspectives, these changes, early implemented in medicine, have not been achieved with the same rate in nursery (6). However, simulation comes from the need of doing techniques and interventions (nursery) without compromising the patient's safety, i.e. low fidelity simulation.

So, there are conceptual and methodological gaps that certainly legitimize the formative option linked to the use of simulation in nursing training, and how the simulation compares to the traditional clinical environment satisfaction of the learning needs of the nursing students (7)

In this context, in November 2011, it was found "Sociedad Chilena de Simulación Clínica y Seguridad del Paciente" (Chilean society of clinical simulation and patient safety), the objectives proposed by this institution were as follows:

- a) "Contribute to positioning clinical simulation as a pedagogical educational model, essential in the education of health sciences in our country.
- b) Ensure progress and development in research for both the clinical and education fields.
- c) Be the official entity, collaborator and adviser of agencies that require assistance in matters that ensure the quality of healthcare and patient safety.
- d) Serve as a communication network between institutions and professionals who perform or want to perform clinical simulation.
- e) Establish links with national and/or international companies or organizations that wish to develop clinical simulation in Chile"

These objectives allow us to visualize that clinical simulation has been a concern for a long time in health science, especially in early professional formation processes.

At the same time, it is relevant to consider the master notion linked to fidelity of the simulators or the simulation. Typically, this term has been used to define the level of realism of the models and of the experience in which they are used. There is a taxonomy that allows to classify simulators in three increasing complexity levels:

- **"Low fidelity simulation:** Models that simulate only one part of the organism, typically used for acquiring basic motor abilities in simple procedures or physical exams; for example, the installation of a peripheral venous via or basic cardiac auscultation.

- **Intermediate fidelity simulation:** The use of an anatomical part is combined with less complex computer programs, allowing the instructor to manipulate basic physiologic variables, and aiming for a better competence development. For example, devices for cardiopulmonary reanimation training.
- **High fidelity simulation:** Integrates multiple physiological variables to create realistic clinical scenarios with life-sized manikins. The aim is to train advanced technical abilities and crisis management skills” (9)

Each one of the studies reviewed so far, value simulation as a concrete experience towards increasing confidence, knowledge, achievement of abilities and skills, safe-patient learning, and increased preparation for the real clinic environment (10-13).

In the professional field of nursing, there is a debate regarding sufficient empirical evidence to support the simulation as a learning environment that meets the learning needs, in addition to supporting its transferability, when students must perform in the real world, in relation to patient care (14). In this respect, it is relevant to the professional field of nursing to describe the meanings about the student's learning when using clinical simulation as a methodology to achieve the competencies declared in the graduation profile.

Other studies show simulation potential as a feasible and valuable learning experience; it has a good effect in learning and students are satisfied with the pedagogic method (15). Furthermore, it is pointed out that simulation helps students be better prepared to satisfy the demands from the world of work and gives more confidence in future decision making (16).

Therefore, the purpose is to uncover the meanings built by nursing students in a simulated clinic environment for satisfying clinical learning needs, in the nursing career at the Universidad Mayor de Temuco.

## Methodology

The investigation is qualitative, in which investigated subjects are considered always being part of sociocultural contexts and therefore, sharing meanings. In this way, every group member in perspective of the qualitative investigation, is an interactive and communicative subject, who shares meanings through complex intersubjectivity and symbolic interaction processes. The research stands from a hermeneutic or interpretive paradigm, whose focus is rather the comprehension of human beings' vital universes than the explanation of mechanical causalities (17).

**Participants:** The study participants were 12 nursing students, coursing the fifth year in Universidad Mayor, sede Temuco.

Inclusion criteria was following: belong to the fifth level of nurse career in Universidad Mayor sede Temuco, have attended *Internado de Enfermería en Urgencia* (Emergency Nursing Internship) in year 2014, subject in which from a total of 234 pedagogic hours, there were accomplished 60 low-, intermediate and high fidelity simulation, and have a ninety or higher percent in attendance.

### Selection Criteria:

#### Inclusion:

- Fifth year students who attended *Internado de Enfermería en Urgencia* subject in year 2014.
- Students that accepted voluntarily to participate in the study.

**Exclusion:** There was no exclusion criterion for this investigation.

**Data collection:** The 12 students were invited to participate in a focus group, understanding it as an open discussion between specially selected people. Discussion focused on a specific topic, in this case, the meanings built by nursing students, a concrete experience in a simulated clinical environment, to satisfy clinical learning needs in the nursing career from Universidad Mayor de Temuco.

Next, 12 in-depth interviews were done. The field's exit was made when there was saturation of the information.

To safeguard the scientific rigor, four criteria were used: credibility, dependence, confirmability, and transferability (18).

Credibility is given for being focused on the investigation objectives orientation, as well as linking the phases of data collection from interpretation and systematization of these.

The transferability criterion was applied at the end of the study through conversion of the information to different formats, mainly to Braille literacy, audible and digital. With the aim of being an element which provides information and describes the needs of the study population. The dependence is evidenced through flexible methods that allow changes to be made. The confirmability criterion is associated with objectivity, basic and essential process within the whole investigation, with the aim of obtaining information as natural as possible from the context.

**Ethical considerations:** In the development of this study informed consent was requested from the students who agreed to participate, respecting the principle of autonomy. The benefits that bring this research from the ethical point of view, lie in the fact that the development of clinical simulation was evaluated in the nursing school of Temuco, allowing this way the feedback on the curriculum, implementing new innovative methodologies without risks for the students who participated in the research. In addition, to contribute to improving the quality of care provided by students and safeguarding the safety of patients treated once they are faced with them in the clinical field. Finally, it is noteworthy that this project was evaluated by the Scientific Ethics Committee of the Universidad Mayor prior to its execution, thereby safeguarding scientific rigor and ensuring the declared ethical principles throughout the investigative process.

To carry out the analysis of information, at first the audios of the focus group and the in-depth interviews were transcribed, written in word format. In a second stage, the reduction of the data was carried out supported by open source and using the ATLAS-TI 7.0 software, the categories, subcategories and codes were collected from the data provided by the focus group and the semi-structured interviews. For the transcription of data, the Jefferson transcription system was applied.

## Results

By analysing the data, 4 categories emerge:

1. Clinical simulation features
2. Formative expectations of clinical simulation
3. Mobilized skills
4. Importance of simulation for clinical simulation

By analysing the first category "**Clinical simulation features**", the persons interviewed agree that in simulation a real hospital environment is lived, this is how they pointed out:

... *“I thought that the environment was less real, but the place is designed very close to a practice center” ... (E1)*. Another interviewee reported: ... *“I really see it as a clinical practice, for me it is a clinical field only that it is not with real patients” ... (E2)*

Some students see it as a practical tool, they express it like this:  
 ... *“it is a much more active way of learning, in which you participate and for nothing in the world is forgotten”... (E2)*; and ... *“living the experience helps a lot, in the class the base is acquired, but living the experience it is different”... (E9)*.

For other interviewees, the clinical simulation exceeds the merely technical-instrumental dimension, and this is reflected in phrases such as:

... *“something I developed in simulation and that was very good, it was critical thinking, you are in a scenario where only you have to act and lead” ... (E7)*.

... *“the most important thing for me, is that I developed leadership skills, we empower ourselves with the role” ... (E8)*.

... *“teamwork is developed, you learn how to handle an equipment because we had to put ourselves in different situations” ... (E9)*.

... *“something really important that is developed in simulation is communication, make the instruction clear to the team and confirm that it was well understood” ... (E4)*

Another code deployed on this category it is that a progressive fidelity is developed according to the level studied, and it is manifested as follows:

... *“you have to internalize it from the first year, it would be an experience even the people that had abandoned their training because they did not get to know the major, would love to”... (E3)*

... *“when starting simulation from the very first levels, you can strengthen yourself and at the moment of facing up to the real situation you are better prepared” ... (E6)*

The students note that clinical simulation is part of the formation process, and that consist in a kind of anticipated transferability of proficiency, which agrees with some statements like:

... *“it helped me a lot fixing some situations that I had to handle in the clinical field, I know how to handle it with a quota of tranquillity that the simulation contributes” ... (E4)*

... *“simulation helps you to get prepared to clinical field situations, having the experience gives you a base to face them, both in the procedurally and emotionally” (E6)*

Finally, in this category emerged the valuation of error code as a source of learning. This is revealed when they declare:

... *“the difference is that in simulation I don't risk that an error could cost expensive to a patient” ... (E2)*.

... *“in a scenario we focused so much on a procedure, we went to the most complex and couldn't solve it, there I learned from mistakes” ... (E10)*

... *“you go to simulation with fear of the unknown, believing that the teachers are going to reproach or judge you, but it is an instance to learn” ... (E5)*

The second category that emerged is **“Formative expectations of clinical simulation”**, within which for the participants it is important the role that played by the teacher into this methodology, expressing some concepts such as:

... *“in simulation the teacher is nearest, you can grab their attention faster. For feedback, it is better on that way, to answer my questions, my doubts “...(E2).*

... *“in simulation you can ask the teacher any question and she explain it, that’s easier, there is more closeness and ties are created with teachers and classmates in that instance” (E8).*

The interviewees refer that simulation encourages a significant learning, and this is how they point out:

... *“my clinical field guide nurse commented to me that she also had noticed that interns arrive more agile than in other years, I think it is because of the simulation that we had” ... (E2)*

Another student says:

... *“in particular, I am not very agile, nor do I have a lot of manual dexterity and it is very difficult for me to develop that and do it quickly above all; but with the simulation I would not have achieved the level with which I entered now”...(E2)*

In the third category **“Mobilized skills”**, unfolds 6 codes, one of them is that when living the experience in simulation, moves skills such as the development of the critical thoughts, and indicates:

... *“this major is a lot of doing and of critical thoughts, in theory classes you form a global idea, but do not encounter the problems that arise when living the experience” ... (E3)*

... *“currently in my internship the simulation helps me reason and make decisions” ... (E2)*

Another code that is presented is the teamwork, the students attach great importance to the development of this competence thanks to their experience in simulation, and it is reaffirmed with some phrases such as:

... *“it helped me a lot to develop teamwork, because we had to put ourselves in different roles and learn to manage an equipment” ... (E9)*

... *“the thing I like the most was to know the different roles, I learned what each one has to do, so I know what I can expect of them and what the rest expect of me”...(E4)*

Another skill mobilized through clinical simulation is the development of interpersonal skills such as the communication and the safety, this is made explicit with the stories of the students themselves:

... *“what takes place a lot in simulation is communication, making the instruction clear and confirming that it was understood well” ... (E4)*

... *“it helps us to have an idea of what we could have to do and lose our fear, as students we don’t have not so much confidence in ourselves and sometimes there are deficiencies in knowledge and psychological, so simulation helps us to function better, with more security” ... (E5).*

... *“in the practice I get very nervous and since I have had the simulation as support, it has helped me a lot to face situations, I have developed my personality” ... (E10).*

Another code associated with the mobilized skills arises, the development of the capacity of leadership skills. The students indicate that simulation helps them develop this skill, which is not achieved in the same way with other methodologies. This is how they refer:

... *“the students arrive better prepared in skills such as leadership, that the staff comply with what is asked of them and also to be clear with them when giving an instruction”... (E2)... “the most important thing for me is that I developed leadership, in high fidelity, especially when adopting different roles and must be the one who leads the group, in practice, one walks like a chicken behind the teacher”... (E8)*

The last category that was revealed was **“Importance of simulation for clinical simulation”**, in which the importance of the anticipated experience of real situations is reinforced, statements arise like:

... *“you get more prepared to the clinic field when you have to handle it by yourself, you arrive with good tools” ... (E3)*

... *“it is a preliminary step to reach clinical practice, we have the opportunity to perform the procedures before in different scenarios, at the moment we are faced with the situation of being able to develop better” ... (E1)*

Or when one of the students says... *“it is a way of learning much more active, you participate and then for anything in the world is forgotten” ... (E2).*

Another code that is displayed, it is the improvement in decision making, and this is evident with the following statement:

... *“if I hadn’t done simulation before, it would have been much less agile, much slower even to reason and make decisions” ... (E2)*

Likewise, the interviewees recognize that before doing simulation, there must be a theoretical knowledge that supports the doing and they express it by pointing out:

... *“at the moment of applying you can detect more errors, you can put yourself in the place of the situation, but it is necessary first to know the updates that have been made regarding the subject” ... (E3).*

... *“I think that to get to simulation, previously it must have a broad, solid theoretical base, it is an instance to go to do and to demonstrate what you have learned”... (E2).*

Another point that stand out the students it’s the clinical simulation provides a safe learning environment, they value the more relaxed atmosphere, which allows them to learn without being overwhelmed by mistakes, in their report they describe it such as:

... *“in the clinical simulation, the ambient is more relax, you can learn other deeper stuff, that maybe you won’t get in a practice due to pressure... (E2)*

Finally, within this category emerge the importance of value the role regarding the lives of others, the participants of the research tell:

... *“it must have a basis and foundation for taking care of the patient, even if it's not real you feel the responsibility of having to know, of having to study... you have the social responsibility, and*

*owe an explanation to everyone of all the mistakes you make, you have to make your own “mea culpa”(my fault)”...(E3)*

## Discussion

Many studies show that clinical simulation is beneficial for students training in the medical field, where mistakes can have serious consequences for users (5, 6, 8). In addition, Chilean legislation guarantees that patient care must be inside a quality and security framework (19).

What some authors point out in relation with clinical simulation, is that it requires an environment as real as possible to the clinical field which the students will face, this allows participants to decrease the insecurity, creating an effective environment for learning and earn skills in a realistic environment (5,20).

The formation of students with the use of this teaching methodology facilitates the training of practical skills and development of required competencies for the professional life, which is achieved by practicing repeatedly, reproducing situations as necessary and allowing the error to be corrected (8,20). Like previous studies indicate, these concepts are reinforced through the speech of the interviewees.

It is recommended that learning through simulation develops along the whole formation program for future professionals, in a systematic and continuous way, passing gradually through inferior simulation levels, mid complexity and finally the highest level; this facilitates theoretic concepts and practical abilities acquisition, necessary for present oneself in the clinical field with a minimum level of competences to take care of patients, and them are more willing to accept than students (1, 5, 16). As already explained, simulation enables making mistakes and learning from them, training and repeating the times the student requires, this of course helps decreasing fear when coming along with a patient, the human error margin decreases influencing directly the patient's safety, what is closely related with the ethical principle of nonmaleficence (1, 8, 20). These ideas accord with the results obtained in our study, in which students expressed they felt better prepared for their clinical practices and it enhances their self-confidence when contacting the users.

The literature shows that simulation is a tool that not only allows development of care-type skills, but also benefits the acquisition of interpersonal skills, such as communication, leadership, teamwork and critical thinking mainly (5,8,20). Also, working with actors it is useful for the student to learn to put himself in the place of the patient when he is evaluated by the health team (1). Therefore, when clinical simulation is performed, promotes the integration of necessary knowledge, skills, and attitudes to achieve competencies (20). Although simulation does not replace clinical practice, it does improve it by allowing students to transfer directly into the environment “real” clinical learning in simulation (3). This corresponds to the stories of our interviewees, who recognize in this methodology an opportunity to acquire this type of skills, which are more complex to develop in the classroom.

The theory gives a basis to the practice, simulation helps the student to apply the practical theory and contributes to form the student’s attitude at the moment of practice performing, it is a pleasing way of learning (16).

To accomplish significant learnings it is fundamental the role the docent plays in these processes, in clinical simulation, the bond made between the student and the docent is much more close, so thereby the student loses the fear to ask questions and feedback becomes more effective,

the docent more accessible (3). Simulation activities implementation, playing real patient experiences through appropriately guided and controlled scenarios, creates an ideal ambient for education; however, the activities design made by the docent must be consistent (8). Part of learning effectiveness in clinical simulation relies on the docent, on the previous preparation which includes not only materials and supplies preparation, but also the unification of the contents criteria and learning results expected the student to achieve (8). In this research came up data apported inductively by students who agree with these studies, they pointed out that in this instance, bonds with the teacher were made due having him closer, it is easier to feedback and they feel supported and protected by the docent.

### Conclusions

This research sought to unveil the subjective meanings constructed by the students. This approach does not refer to the private level of human beings, but rather directs us to the sphere of the complexity of the world of intersubjective relations developed in practices, whose distinctive feature is the capacity for self-interpretation and the different actors interpretations.

Health care is increasingly regulated and the model changes tend to assure the quality of patient care and in a safe environment, therefore clinical simulation is a very useful educational strategy, especially in training of future health professionals, where a student's error in practice can have severe consequences.

Learning in a safe environment, which allows mistakes and repeating situations repeatedly until achieving learning results is very appreciated by students and beneficial for patients. In this context procedural competencies are acquired, but what has special meaning is the possibility of developing emotional and attitudinal competencies.

To have a successful learning process, a compromised and prepared docent is required. This facilitates learning by allowing the students bonding in a tighter way with the teacher, feeling in a secure and reliable environment.

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