



## Development of a theoretical-practical script for clinical simulation\*

Construção de um roteiro teórico-prático para simulação clínica

Construcción de un guión teórico práctico para la simulación clínica

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### ABSTRACT

**Objective:** To develop a theoretical-practical script based on the opinion of experts to be used in simulated clinical activities. **Method:** Qualitative study through analysis of content of interviews with experts on the theme in order to develop the proposed script. Of the 24 invited experts, 12 specialists from educational institutions in Brazil and abroad participated in the study in compliance with the ethical precepts. The experts responded to questions on the characterization of their study attributes and described the items required for the development of a simulated scenario. In view of the responses obtained, data content was analyzed and classified into units and subunits of significance. **Results:** The items mentioned for the development of the script generated seven units of significance. The units and subunits of significance were gathered in three stages of the main components of the simulated scenario: prior, preparation, and finals. **Conclusion:** This study enables an innovative, stimulating teaching experience, making it easier for professors to use the simulation resource as a learning process in an effective and objective manner, as a guide to professors and researchers in the area of clinical simulation.

### DESCRIPTORS

Simulation; Education, Nursing; Learning.

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## INTRODUCTION

During the training process of an individual for health-care professional practice the clinical experience represents an important part of the training, particularly in nursing, as it prepares undergraduates for professional practice. However, the lack of confidence of the students often leads to a decrease in the expected performance and an increase in levels of anxiety, affecting the undergraduate in a negative manner. For this reason it is important to adopt teaching strategies that promote learning, reduce anxiety and stress, and increase levels of self-confidence. In this sense, the use of simulated teaching has been shown as an important tool in the teaching-learning process<sup>(1)</sup>.

Simulation promotes the early contact of the student with nursing interventions in controlled environments, allowing mistakes, training, and repetitions, prior to real-life experience. Thus, it leads to excellence in the processes and provides high safety standards. Today patient safety is a high priority issue as it represents a global problem affecting millions of people, resulting in disabilities, injuries, or deaths<sup>(2-3)</sup>.

Simulation develops self-confidence and minimizes the psychological impact of patient-care execution<sup>(4-5)</sup>. From the perspective of learning, it may be considered more didactic than the situations experienced in a real context as it is strategically focused on defined objectives and occurs in controlled environments in which mistakes are allowed and the reconstruction of learning is continuous<sup>(1)</sup>.

In order to be effective, the simulated practices should be planned according to an increasing level of complexity, enabling students to demonstrate the skills acquired in each training stage<sup>(6-7)</sup>. In this sense it is necessary to build well-planned clinical scenarios that bring the student as close to reality as possible, allowing cognitive, psychomotor, and affective experiences that contribute to the transfer of knowledge from the classroom to clinical environments<sup>(8)</sup>.

Despite the existence of associations with relevant and prolific work on the theme, the systematization of the construction of the scenario is still discussed by the experts in the area. The use of tools to instrumentalize the activity of the professor-facilitator<sup>(9-12)</sup> is required, as the planning and execution of the simulated activity are important in the relation with the learning objectives.

A guiding script for the development of simulated clinical scenarios appears as an innovative, promising proposal, and in this sense this study aims to develop a theoretical-practical script based on the opinion of experts to be used in simulated clinical activities.

## METHOD

This was a qualitative study to elaborate a theoretical-practical script in simulated clinical activity.

The script was developed through analysis of the content of interviews with experts on the theme. Content analysis consists of a set of techniques to conduct analyses during the process of reading the results, systematized by essential concepts that may be described by: objectivity, systematicity, manifest content, registry units, context units, construction

of categories, category analysis, inference, and conditions of production<sup>(13)</sup>.

In this sense the snowball technique was used to select the experts on the theme<sup>(14)</sup>. The experts were invited and characterized according to the criteria proposed by Fehring for analysis by specialists<sup>(15)</sup>. Criteria of inclusion included a master's degree in nursing, a doctoral thesis in the area of interest of the study, experience in clinical practice, study in the area of interest of the research, articles published on the theme, and participation in events in the area<sup>(15)</sup>.

For the development of the study the participation of the experts was requested through the completion of the Instrument of Characterization of Individuals, an instrument to describe the items required for the development of a theoretical-practical script for simulated activity, and a collection instrument containing the following open question: *Which items are necessary for the construction of a simulated scenario?*

According to the snowball technique<sup>(14)</sup> the data collection instruments were submitted to a professional (key informants) who collaborated with the names and email addresses of three professionals that met the criteria of inclusion of the study. The Informed Consent form as well as data on the aims of the study were delivered together with the invitation to participate in the study. The invited experts were requested to return the data collection instruments within a period of 30 days.

Of the 24 experts on the theme that were invited from several educational institutions from Brazil and abroad as well as Clinical Simulation Centers, 12 agreed to participate in the study and returned the instrument duly completed via email. The participants were identified as subjects (S) from 1 to 12.

Data related to the characterization of the subjects were grouped according to gender, age, year of completion of graduation studies, training course, time (in years) of work in the area, academic degree, and experience in using clinical simulation.

For analysis of content of the obtained responses the data were categorized, classified, and quantified for results interpretation. After exhaustive reading of the primary categorization, data were realigned in larger groups by context related to the construction of the simulated situation and according to the subjects evidenced in the interviewees' original messages. Subsequently they were listed in units of significance and in contextual units covering the messages in full according to the participants.

The categorization of the results was based on the following criteria: uniformity; exhaustive reading of the texts; appropriate classification; objectivity in the interpretation; and adequacy to the aims of the study<sup>(16)</sup>. After the organization of the data in groups the main components that would make up the proposed script were identified. Moreover, repetition of data was observed in some contexts; these were grouped into subunits of significance to make up and complement the primary data.

The present study was submitted and approved by the Brazilian National Research Ethics Committee (CONEP) under protocol number 505.722, 18/12/2013. Anonymity and freedom to quit the study were guaranteed to the participating group of experts.

## RESULTS

Of the total of 12 participating experts, nine were women and three were men. Mean age was 38.8 years. All of them had graduated in nursing between 1981 and 2007. In relation to the time of training, two had graduated more than 30 years ago, three between 21 and 28 years ago, five between 11 and 16 years ago, and two eight years ago. Regarding the academic qualification, seven participants reported to have a *lato sensu* postgraduate degree; ten attended a master's degree; five had a doctor's degree; and three were pursuing their doctoral degrees.

Regarding their occupation, ten were professors in the nursing graduation course, one was a clinical nurse, and one was responsible for the Realistic Simulation Center. In relation to the time of professional performance in the current area, one reported up to one year, four up to seven years, five between nine and 14 years, and two reported over 25 years. Regarding previous professional experience, all of the subjects reported that they had already worked in hospital institutions in direct patient care, and two also worked in primary healthcare services.

In relation to the use of clinical simulation, all the subjects reported experiences in simulated teaching and

participation in scientific events in the area over the last two years. Eight participants reported having scientific production published in the area of clinical simulation.

The theoretical-practical script of the simulated activity was elaborated through the analysis of the content of the responses received from the experts, resulting in seven units of significance: 1. Previous knowledge of the learner; 2. Objectives of the learning; 3. Theoretical foundation; 4. Preparation of scenario; 5. Development of the scenario; 6. Debriefing; and 7. Assessment. Also, subunits of significance were found in some units of significance. After organization of the data into groups of units and subunits of significance the units were grouped into three stages of the main components to make up the proposed script: previous components; preparation; and final components of the scenario.

Chart 1 presents the units of significance in relation to the *previous components to the scenario* and the respective subunits of significance according to the experts and the contextual units.

The unit of significance *preparation of the scenario* is described in Chart 2 with the justifications through the subunits of significance and contextual units of the interviews.

Regarding the final stage of the scenario, the items highlighted by the experts are presented in Chart 3.

**Chart 1** – Units of significance of the *previous components to the scenario* and the subunits of significance according to the experts and the contextual units – Ribeirão Preto, São Paulo, Brazil, 2015.

Units of significance of Previous Components to the Scenario	Subunits of significance according to the experts	Contextual units
Previous knowledge of the learner	Identification of theoretical foundation of the theme/previous knowledge	S10 (...) <i>definition of the complexity of the scenario according to the target audience and previous knowledge of the participants.</i>
Learning objectives	Primary/secondary learning objectives	S12 (...) <i>definition of measurable primary and secondary learning goals and objectives</i>
Theoretical foundation	References Submission of pre- and post-training material	S5 (...) <i>references.</i> S9 (...) <i>submission of pre- or post-training material</i>

**Chart 2** – Subunits of significance and contextual units of the preparation of the scenario – Ribeirão Preto, São Paulo, Brazil, 2015.

Subunits of significance according to the experts for preparation of scenario	Contextual units
Theme	S6 (...) <i>theme that will be approached in the scenario.</i>
Name of the person in charge of the elaboration Complexity of the scenario (expected interventions/expected outcomes, level of complexity/fidelity)	S5 (...) <i>name of the person in charge of the elaboration.</i> S1 (...) <i>interventions expected during the scenario.</i> S7 (...) <i>development of the scenario (with assessments and interventions expected by the students).</i> S10 (...) <i>definition of the complexity of the scenario according to the target audience and previous knowledge of the participants.</i>
Documents (checklist, date of elaboration and review, description of the scenario to the instructor, description of the script to the actors, medical diagnosis, structure of the proposed case/summary, script/instructions)	S12 (...) <i>elaboration of checklist of priority actions for the execution of the case that will be used by the professor (and may or may not be also made available to the students that will attend the scenario) to facilitate the execution of the debriefing.</i> S3 (...) <i>storyboard, scene, main actions expected and responses of the simulator.</i> S12 (...) <i>script of instructions to the actors and/or parameters and speeches of the mannequins (...).</i> S6 (...) <i>medical diagnosis/reason for the current care or hospitalization.</i> S5 (...) <i>description of the clinical case.</i>

continued...

...continuation

Subunits of significance according to the experts for preparation of scenario	Contextual units
Material resources (Available resources, Equipment and programming, Sound and image, Material resources and simulators, Drugs being used)	S9 (...) available resources (infrastructure and human). S1 (...) <i>equipment and programming of the scenario.</i> S2 (...) <i>well-trained simulation team to record the scenario and facilitate the debriefing.</i> S5 (...) <i>required simulators/materials.</i> S6 (...) <i>drugs being used.</i>
Characterization of the simulators/actors	S7 (...) <i>preparation/characterization of the simulator or actor.</i>
Physical space/environment	S7 (...) environment (preparation of the environment in which the scenario occurs: surgery, medical services, emergencies...).
Human resources (Target audience, Professors /Facilitators/ Instructors/ Technicians, Training facilitators, Actors, Collaborators)	S1 (...) <i>participants: professors, students, actors, employees, collaborators.</i> S9 (...) <i>instructors.</i> S8 (...) <i>experience of the professor in the area.</i> S2 (...) <i>having the actor of the scenario, that is, people committed to the interpretation of the scenario to be discussed or requesting participation within the class.</i> S7 (...) existence or not of medical support or other technical/non-technical support (ex.: firefighter/friend or family member).
Training of the team for the activity	S12 (...) <i>planning the participation of actors and/or mannequins (script of instructions for actors and/or parameters and speeches of the mannequins...).</i>
Validation of scenario	S2 (...) <i>make sure that the scenario is prepared in an appropriate manner.</i>

**Chart 3** – Units of significance of the final components of the scenario, subunits of significance according to the experts, and the contextual units – Ribeirão Preto, São Paulo, Brazil, 2015.

Units of significance of the final components of the scenario	Subunits of significance according to the experts	Contextual units
Development of the scenario	Progress of the situation Critical factor of the scenario Clues Estimated time of the scenario/must be short	S7 (...) <i>progress of the situation (stabilization; recovery; death...).</i> S8 (...) <i>clues to help the individuals to assimilate the scenario.</i>
Debriefing	Theoretical foundation Debriefing/planning Points to be discussed in the debriefing/critical points Estimated time of the debriefing	S2 (...) <i>previously discuss the theme with the student. They need to have a theoretical foundation on the theme.</i> S12 (...) <i>planning the debriefing respecting its stages and objectives.</i> S3 (...) <i>points to be theorized by the facilitator.</i>
Assessment	Assessment of the activity	S4 (...) <i>printed for assessment of the activity.</i> S8 (...) <i>assessment of the simulated activity.</i>

## DISCUSSION

The construction of a simulated activity should be guided with the support of intentionality matrices that determine the learning objectives and focus to be achieved by the student. In health, particularly nursing, the performances are related to the recognition of the health needs, leading to substantial planning and care in the creation of the activity<sup>(17)</sup>.

No studies were identified in the literature specifically addressing instruments to develop simulated scenarios, nor studies approaching the construction of a script with this purpose, possibly consisting in a limitation of the study and restricting its argumentation. Therefore, this discussion was based on the use of authors that approach the learning strategy.

All the subjects of the study had worked in clinical institutions, evidencing the professional experience of the professors and leading to a successful construction and concretization of the simulated scenarios. It is imperative that

the facilitator has proficiency and experience in the clinical activity that they propose to simulate, proficiency in communication and information technologies, and an ability to perform dramatizations. In this sense they simplify and dynamize the proposed scenario, assuming extremely important roles within the simulated environment<sup>(18-20)</sup>.

In relation to the interviews of the experts participating in the development of the script of the simulated scenario, seven units of significance and their respective subunits were found; they were organized into three stages of the script: previous knowledge; preparation; and final components of the scenario to present the results of the study.

In the stage *Previous knowledge of the scenario* the unit of significance *Previous knowledge of the learner* corresponds to a means of organization to incorporate, understand, and memorize the new information. These are key points of relevant content existing in their cognitive structure.



In meaningful learning there is a constructive integration of thoughts, feelings, and actions that leads to the qualification of the student, as well as their commitment and responsibility, by means of investigation and description of the cognitive process<sup>(21)</sup>. It is a process in which the learner continuously learns with meaning, as the author of their own learning<sup>(22)</sup>. Among the various meaningful learning strategies that have been in use, this study highlights those that use simulated teaching. In simulation, the definition of the skills to be achieved, the objectives of the simulated scenario, and the complexity of the activity<sup>(23)</sup> are possible only after analysis of the previous knowledge of the learner by the professor/facilitator.

The unit of significance *Learning objectives* refers to the results intended for the learning of the student and should be clear and well-defined<sup>(3)</sup>. The experts also mentioned the need to define primary and secondary learning objectives as shown in Chart 1.

Through the defined objectives, the professor/facilitator defines the content to be approached, the expected interventions, and the skills to be acquired by the learner in the execution of the scenario. Prior to the execution of the activities the learners should receive all of the relevant and necessary information according to the complexity of the simulation. It is recommended not to exceed three or four objectives for approximately 10 minutes of simulation<sup>(5)</sup>.

In relation to the *Theoretical foundation*, a theoretical basis is required for a successful simulated activity and achievement of the established objectives. In this context, in simulation the developed clinical cases and skill trainings should be based on the best levels of evidence available rather than simply justified by the personal experiences of the instructors, a fact that strengthens the level of confidence of the students. Moreover, it is important to consider principles such as simplicity, brevity, objectivity, reality, and comprehensiveness. The cases should be simple and limited to data that will support the learners in the resolution of the activity<sup>(23)</sup>.

Through the proposed objectives and according to the skills that are intended to be achieved, in the stage *Preparation of the scenario* the professor/facilitator may establish a theme for the scenario that will be applied. The scenarios should offer cognitive, psychomotor, and affective experiences that contribute to the transference of knowledge from the classroom to clinical environments<sup>(8)</sup>. In these, the professor/facilitator should, in addition to observing the level of knowledge of the students, be judicious in relation to originality, reality, and complexity<sup>(24-25)</sup>. The expected results and interventions, as well as the previous knowledge of the participants, define the choice of the level of complexity of the activity<sup>(26)</sup> and establish an increasing level of information.

As shown in Chart 2, in order to facilitate the organization of the developed activities some interviewees report that the use of a checklist of priority actions is helpful for the execution of the case in the construction of the scenario to be used by the professor/facilitator. For the students the checklist will be intended to guide the observation for simulation, facilitate the debriefing, and guide the reflection<sup>(27)</sup>.

Among the necessary documents they also describe the need for a detailed circumscription of the scenario for the professor/facilitator, technicians, and actors linked to the simulation, as well as the construction of a document that contains the structure of the clinical case, such as medical diagnosis, reason for the hospitalization, previous history, vital signs and examinations, and others.

Human resources are also essential in the construction of the scenario, as the need to define the target audience (participants and number of participants), the professors/facilitators and instructors, the use of actors, and the possibility of using collaborators (individuals that simulate other professionals or family members of the simulated patient) was emphasized. The importance of the expertise of the professors/facilitators was also emphasized; as a matter of fact it has already been discussed by other authors<sup>(5,26)</sup>.

The training of the professor/facilitator is extremely important for the execution of the simulation. In the dynamics of the teaching-learning process, it is important that the professors/facilitators are primarily trained with experts on the theme so that they may use this didactic resource. Also, they should meet on a regular basis to exchange personal experiences and updates on the theme<sup>(28)</sup>.

In relation to the veracity of the situation of the scenario, simulators and actors should be characterized in a way that reproduces a real situation. Resources such as clothing, makeup, and accessories may be used according to the need of the intended scenario<sup>(27)</sup>. The use of actors also contributes to the assessment and performance of the students before the situation they face<sup>(17)</sup>.

In relation to the material resources, as described in Chart 2, the interviews pointed out the need for audio and video equipment to facilitate the debriefing, the use of simulators (low, medium, and high fidelity, according to the learning objectives), medical and hospital materials, and drugs being used. The materials that will be used should be available and visible to the students. In the simulated environment, just as in the clinical environment, the learners remain standing most of the time. However an environment with good ventilation, acoustics, and lighting should be considered<sup>(23)</sup>. A successful simulated scenario also requires further care, including testing and validation before using it with the students so that important details in the execution are not neglected<sup>(26)</sup>.

Regarding the stage *Final components of the scenario*, the unit of significance *Development of the scenario* points out that the development of the scenario requires that the participants be informed about the progress of the clinical case of the patient, the previous history, and the situation of the patient at the moment of resolution of the scenario.

Definition of a time limit for the simulation is another important aspect. Extensive activities are not recommended; in general the execution should take approximately 8-10 minutes and the debriefing 20 minutes<sup>(26,28-29)</sup>. The time should be set and, even if the expected interventions are not achieved, the scenario should be closed. The relevant points and failure in the resolution, including mistakes and successes, should subsequently be discussed<sup>(28)</sup>.

In this sense, the unit of significance *Debriefing* relates to the process in which the professor/facilitator jointly promotes the development of reasoning and judgment skills through the reflexive learning process with the learners<sup>(29)</sup>. It is important to point out that the whole debriefing process should be a stage of clarifications, planned and directed to the promotion of a reflexive, critical thought by the student. Confidentiality should be kept, ensuring that it is not used to assess or ridicule the situation or the participants<sup>(26)</sup>.

The unit of significance corresponding to the *Assessment* comprises the process of identification of the level of skills of the students involved in the simulation in relation to attitudinal development and level of knowledge<sup>(24)</sup>. It aims to assess and collect information, organizing, explaining, and intervening in order to promote a meaningful learning. It should be formative, deliberate, and continuous, triggering learning development and improvement. In simulation it is linked to the learning objectives and the complexity of the scenario. It must be carried out in an integrated manner, observing skills, attitudes, and knowledge<sup>(26)</sup>. It may be carried out through the use of forms, which should be previously established and known by the learners<sup>(19)</sup>.

In order for the simulation to be effective and achieve the expected results it should be developed by means of a scenario that covers the proposed objectives. In this sense the seven units of significance that make up this script point out the items that must be organized in relation to the construction of the simulated scenario, thus guiding the professor/facilitator in any simulated activity practices,

contents, disciplines, and situations that they want to promote to the students.

## CONCLUSION

The guidance of a theoretical-practical script for the construction of a simulated scenario represents an important contribution to the teaching-learning process of the students as they direct the expected results and clarify the defined objectives. The interviewed experts mentioned several units and subunits of significance, which have incorporated the recommendations of the researchers and should guide the simulated activities.

In this sense, although the number of experts may be considered a limiting factor in this study, the construction of the theoretical-practical script of a simulated scenario may contribute in an effective way to the implementation of the simulated teaching strategy (low, medium, and high fidelity).

The present study aims at enabling an innovative, stimulating teaching that facilitates the use of the simulation resource by the professor as a teaching process in an effective and objective manner, as well as guiding professors and researchers in the area of clinical simulation. In addition, further research to support the development of scripts such as the proposed one is suggested. Further studies are aimed at validating the aspect and content of the instrument, as well as testing it in a systematic manner, as it is a tool of easy understanding and essential relevance in simulated activities in clinical practice.

## RESUMO

**Objetivo:** Construir, com base na opinião de peritos, roteiro teórico-prático para uso em atividade clínica simulada. **Método:** Trata-se de um estudo qualitativo por meio de análise de conteúdo de entrevistas de peritos no assunto para construção do roteiro proposto. Seguido os preceitos éticos, entre os 24 peritos convidados pertencentes a instituições de ensino do Brasil e do exterior. Os peritos responderam a questões sobre a caracterização dos seus atributos de estudo e descreveram os itens imprescindíveis à construção de um cenário simulado. Diante das respostas obtidas, os dados foram analisados em relação ao seu conteúdo e organizados em unidades e subunidades de significância. **Resultados:** Participaram 12 especialistas. Os itens mencionados para construção do roteiro originaram sete unidades de significância. As unidades e suas subunidades de significância foram ainda reunidas em três fases dos componentes principais do cenário simulado: prévios, preparo e finais. **Conclusão:** Este estudo permite um ensino inovador, estimulante e possibilita a facilidade ao professor, quanto à utilização do recurso de simulação, como processo de aprendizagem de maneira eficiente e objetiva, sendo um norteador aos docentes e pesquisadores na área de simulação clínica.

## DESCRITORES

Simulação; Educação em Enfermagem; Aprendizagem.

## RESUMEN

**Objetivo:** Construir, con base en la opinión de expertos, un guión teórico-práctico para empleo en actividad clínica simulada. **Método:** Se trata de un estudio cualitativo por medio de análisis de contenido de entrevistas de expertos en el asunto para construcción del guión propuesto. Seguidos los preceptos éticos, entre los 24 expertos invitados, participaron 12 expertos pertenecientes a instituciones de enseñanza de Brasil y del extranjero. Los expertos respondieron a cuestiones acerca de la caracterización de sus atributos de estudio y describieron los puntos imprescindibles para la construcción de un escenario simulado. Ante las respuestas obtenidas, los datos fueron analizados con relación a su contenido y ordenados en unidades y subunidades de significación. **Resultados:** Participaron 12 especialistas. Los puntos mencionados para la construcción del guión originaron siete unidades de significación. Las unidades y sus subunidades de significación fueron asimismo reunidas en tres fases de los componentes principales del escenario simulado: previos, preparación y finales. **Conclusión:** Este estudio permite una enseñanza innovadora, estimulante, y posibilita la facilidad al profesor en cuanto a la utilización del recurso de simulación, como proceso de aprendizaje de manera eficiente y objetiva, siendo un orientador para los docentes e investigadores en el área de simulación clínica.

## DESCRIPTORES

Simulación; Educación en Enfermería; Aprendizaje.

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