Skills and clinical simulation laboratory in times Covid-19: possibilities and practical recommendations

Raphael Raniere de Oliveira Costa[1], Ádala Nayana de Sousa Mata[1], Rodrigo Guimarães dos Santos Almeida[2], Verónica Rita Dias Coutinho[3], Leandro Yukio Mano Alves[4], Alessandra Mazzo[5]

ABSTRACT

This article aimed to reflect on the possibilities of the skills laboratory and clinical simulation as a potential space for training and development of skills and abilities in health education, in addition to sharing strategies for teaching planning and the use of these spaces in times of the COVID-19 pandemic. A descriptive, exploratory, qualitative study based on the consultation of health recommendation protocols, guidelines/planning of national and international public universities for the return of practical academic activities in health area courses and the opinion of experts in clinical simulation. Specific and common guidelines are shared considering the types of simulation proposed, strategies to support simulated clinical experiences, and health guidelines. These recommendations should be discussed and adapted according to the different realities, updating health and education agencies' health guidelines, besides monitoring the pandemic's behavior caused by the coronavirus worldwide.

Keywords: High Fidelity Simulation Training. Patient Simulation. Simulation Training. Coronavirus Infections. Laboratories.

INTRODUCTION

On the last day of 2019, the government of Wuhan, China, announced the emergence of a new coronavirus infection in humans. The 2019 coronavirus disease (2019-nCoV) spread rapidly to the rest of the world, being declared by the World Health Organization (WHO) as a pandemic with significant morbidity and mortality[1]. Coronavirus (CoV) is grouped in the viral family group, preceded by Middle East Respiratory Syndrome (MERS) in 2012 and Severe Acute Respiratory Syndrome (SARS) in 2003[2]. According to the WHO, by July 20th, there are already more than 14 million cases and almost 600 thousand deaths from the coronavirus, Brazil being the second country in the world with the highest number of cases and death[3].

After the first days of contamination, common clinical manifestations such as fever, cough, fatigue, sore throat, headache and shortness of breath can appear n coronavirus infections. There is high transmissibility of the virus, since the infection is transmitted through droplets, aerosols or by contact with contaminated surfaces. In addition, there is the possibility of transmission by people being asymptomatic, or even before the onset of symptoms. Some groups of patients are more likely to progress to pneumonia, respiratory failure and death. The treatment is essentially supportive for symptomatic patients, because there is still no vaccine or specific medication for the treatment of COVID-19[4].

Thus, to control the spread of the virus, restrictions of social and environmental level were implemented in several countries, such as the use of masks, social distancing, with the closure of commercial establishments, schools and universities[5]. However, these measures alone are not enough to contain COVID-19. It is necessary to combine strategies for greater effectiveness in order to maintain a positive relationship with the number of deaths and the reduction of

[1] Universidade Federal do Rio Grande do Norte. Escola Multicampi de Ciências Médicas. Caicó, (RN), Brasil.
[2] Universidade Federal de Mato Grosso do Sul. Instituto Integrado de Saúde, Campo Grande, (MS), Brasil.
[3] Escola Superior de Enfermagem de Coimbra, Unidade Científico-Pedagógica de Enfermagem Médico-Cirúrgica. Coimbra, Portugal.
[4] Universidade de São Paulo, Instituto de Ciências Matemáticas e Computação, São Carlos, (SP), Brasil.
[5] Universidade de São Paulo. Faculdade de Odontologia, Bauru, (SP), Brasil.

virus transmission. It is important to consider that the social and economic consequences of these measures are numerous, among them the presence of increased mental disorders in individuals and increased the unemployment rate. Thus, decision-makers need to monitor the rates related to the virus outbreak and the impacts of the recommended measures[6].

For the resumption of services, mainly from educational institutions, it is important to consider a safe space for students and employees, ensuring physical distance. Thus, researchers point out four possibilities of return of student activities, namely: i.) the closing of schools and universities until the emergence of a vaccine, specific treatment or herd immunity; ii.) the complete reopening when the transmission factor is well below 1; iii.) the partial reopening, with the division of students in part of the week or shifts, which enables social distancing, and iv) the hybrid approach, when classes can also be transmitted online[7].

Regarding the academic activities, mainly for the health area, the discussion for the resumption of teaching happens in order to protect students, teachers and professionals involved in the teaching learning process, as well as to minimize interruptions in training and care provision[8]. Usually, teaching in the health area is based on traditional models, in a synchronous and face-to-face way, with skills training and practical insertions in health institutions[9].

With the need to increasingly make learning meaningful, the use of active teaching methodologies has been stimulated, emphasizing the use of clinical simulation[10]. Studies have pointed out in situ simulation, which happens in the real clinical environment, as an important initiative that has improved patient safety in this public health emergency scenario[11,13]. In addition to the already known potential, clinical simulation has been reported as a valuable method in training health professionals and restructuring and observing changes in hospital flows, training teams to identify risks and other variables in the context of the COVID-19 pandemic.

Thus, faced with the instability of the COVID-19 pandemic and the need to resume teaching activities, it is necessary to think and use innovative teaching methods, technologies, and adapt training programs with modifications in the working groups and decrease in the frequency of activities[14]. In this sense, the importance of expanding the understanding of teaching for this moment, related to health issues with pedagogical guidelines for teaching for simulation, strategies to support simulated clinical experiences and evaluation of health practices is highlighted.

Based on these considerations, we aimed to discuss on the possibilities of a clinical simulation laboratory as a potential space for training and development of skills and abilities in health education, in addition to sharing strategies for teaching planning and the use of these spaces in times of pandemic by COVID-19.

METHOD

A descriptive, exploratory, qualitative study carried out based on the consultation of protocols of sanitary recommendations, the guidelines/ planning of national and international public universities for the return of practical academic activities in health courses and teaching strategies, and the opinion of experts in clinical simulation, linked to the Multi-campus School of Medical Sciences of the Federal University of Rio Grande do Norte (EMCM/UFRN), Brazil; University of São Paulo, (USP) Campus of Bauru, Brazil; Federal University of Mato Grosso do Sul (UFMS); and Coimbra School of Nursing (ESEnfC), Portugal.

The possibilities and challenges of the skills laboratory and clinical simulation are discussed in the context of the return to face-to-face activities in the context of a pandemic. In this perspective, pedagogical strategies, structural adaptations and sanitary recommendations are pointed out, including skills training, simulated clinical experiences of low, medium and high fidelity, besides the evaluations in the Objective Structured Clinical Exam - the OSCE - and Clinical Skills Assessment (CSA) format. It also presents some support strategies such as simulated videos, monitoring, preceptor in simulated practices, academic leagues, and basic clinical integration in simulated practices and work routines in laboratory and simulation centers.

RESULTS

By considering the various possibilities, classifications and specificities of the simulation sessions, we present some strategies/ recommendations that may be useful for teachers, institutions and technical staff for the planning and execution of practical activities in this new global scenario. In chart 1, specific and common recommendations related to skills training, clinical simulation, and evaluations are pointed out. In chart 2, some support strategies related to the phenomenon of this study are presented.

Chart 1

Types of simulation, objectives and specific and common recommendations. São Paulo, SP, Brazil, 2020.

Type of simulation	Specific recommendations	Common recommendations
Technical skills/ procedures training	Identify the real need for skill training at that time of the course and, when possible, allocate the activity to another time/space in the curriculum.	Identify in advance the number of simulators available in the laboratory or simulation center for the execution/training of the skill.
	Work with small groups of students.	Identify the number of teachers and technicians needed for the task.
	Make available a checklist of the procedure and/or skill script in advance so that the student can easily understand the stages of the technique/procedures and/or laboratory practice in order to reduce the time spent in the laboratory and provide individualized training.	If available, contact monitors and/or preceptors for assistance/facilitation.
		Organize the laboratory environment with spaces that ensure a safe distance between practical stations using personal protection equipment.
	Make available and or record videos of the procedure/technique object of the skills training, as well as other resources for learning.	When necessary, seek technical computer support to assist in the construction of electronic evaluation instruments.
		Explore Remote Access Features.
		Provide online platform/application schedules for on-demand questions.
		When pertinent, make use of an electronic checklist (google forms).
		When feasible, purchase good quality audio and video capture equipment.
		Enable teachers to use digital information and communication technologies.

(Continue)

(Continuation)

Type of simulation	Specific recommendations	Common recommendations
Simulation session	Make the study material related to the learning objective available via email, platform and/or Institutional Virtual Learning Environment. When possible, use the remote simulation feature (either by recording the simulation session or by using learning platforms that use virtual reality simulation). For the face-to-face simulation, the teacher may invite a small group of students (depending on the learning objective) and proceed with the execution of the scenario that can be transmitted in real time to the other students in the group/classroom to other spaces even in their homes. Performing the debriefing synchronously. The platforms also allow the facilitator to meet in different rooms online/virtually where students are allocated for debriefing, as well as to bring all students together in the same virtual "room. Record the attendances, during the simulation session, for the debriefing discussion.	
Evaluation using simulation (OSCE and CSA).	When possible, use the OSCE or CSA Web resource. Bet on formative evaluations over summation. Plan objective and short time seasons. When the use of web-based assessments is impossible, it is recommended to plan and reserve multiple rooms for a maximum allocation of 5 to 10 students on hold for the assessment, ensuring the recommended distance from each and the use of personal protective equipment. When possible, make use of filmed stations (no evaluator needed at the time of evaluation).	

Source: Research data, 2020.

Chart 2

Estratégias de apoio às experiências clínicas simuladas. São Paulo, SP, Brasil, 2020.

Support strategy	Possibilities
Simulated videos	Use video resources to demonstrate skills (communication, motor, affective, social, management) practice scenarios, simulated scenarios, feedback, evaluation and debriefing. Encourage students to create their own videos, even from a distance the making of the video can be considered a group work and increase the level of interaction among students.

(Continue)

(Continuation)

Support strategy	Possibilities
Monitoring	Create monitoring programs focused and linked to the Laboratory of Skills and Simulation, because these will approach the resources. Enable the monitors, give work autonomy. The monitoring activity forms new facilitators and is part of the monitor's study schedule. Support other teachers to describe tools (checklists and/or even e-books) that will support the work of monitors.
Preceptor in simulated practices	The preceptor has high commitment and clinical knowledge and technical dexterity. He should receive training as a facilitator which will enrich the simulated practices in general and in the current context, where not even the clinical fields are the same of pre-pandemic for the severity of the patient, or necessary adaptations, have a relevant role in bringing clinical experiences close to the real (pre-pandemic). In addition, the preceptor can collaborate in the division of students, minimizing participants per season.
Academic leagues	Participation of students and tutors in the construction of specialized teaching materials.
Basic clinical integration in simulated practices	Bringing teachers from the basic area to the development of clinical stations causes the division of students, minimizing the participants per station; the approach of teachers from different areas of knowledge creates the opportunity for contact between the teacher of the basic area with the student who is mostly only "attending" the theoretical classes, in synchronous and asynchronous activities in large groups and opens the opportunity to maintain this integration in the post pandemic.
Review established routines	The coordinator of the Skills and Simulation Laboratory is responsible for reviewing the hours of operation (extending and extending to the night period and meal intervals) to provide access for students, to provide ways of scheduling to ensure the reduced number of people on site by complying with the distance and using PPE's, review cleaning routines; ensure perfect indication of the traffic of people, length of stay, avoiding unwanted encounters; provide support areas for eating; wait and rest of students and teachers and if not yet make extensive use of sound and image, invest in the storage of images, which in the current period can be done with few resources and will have high impact or direct transmission.

Source: Research data, 2020.

Protocols for access, stay and exit of laboratories and simulation centers

In addition to following health recommendations, each skills lab and/or simulation center create its internal protocols for access, stay and exit from their spaces. Below, the authors suggest sequences of procedures that can be adapted to different realities. In figure 1, a proposal for the flowchart of entry, stay and exit of the laboratories and simulation centers is presented. In table 3, some of the sanitary recommendations are presented.

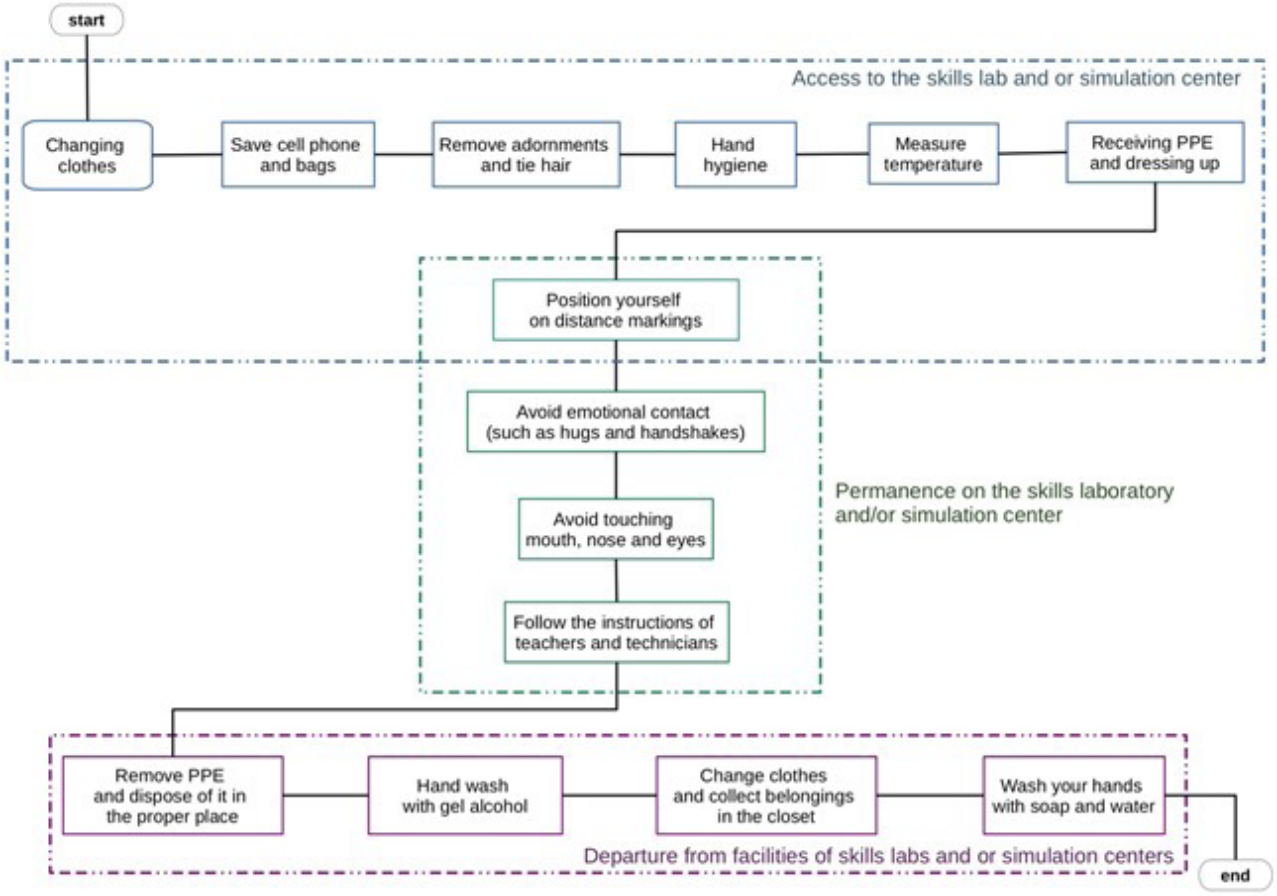

Figure 1: Flowchart of access, stay and exit of the laboratories.

Source: Developed by the authors.

Chart 3

Health recommendations for skills lab and/or simulation center. São Paulo, SP, Brazil, 2020.

Health recommendations
Enable a place for PPE garment/dismantling.
When necessary and feasible, ask students to make use of their own instruments (stethoscope, clipboards, flashlights, etc.) properly sanitized.
Recommend students to leave a spare shoe, as well as a coat, in their lockers when possible so that they can only use them in the labs.
Ensure that the laboratory space allows a safe distance between students (minimum 1 meter). Mark floors and corridors.
Ensure natural ventilation/circulation of air between the environments of the skills lab and/or simulation centers.
Ensure and enable PPE for all those involved in the activities (teachers, students and employees).
Perform the disinfection of the environment with sanitizers at each practice group exchange/relay or every two hours.

(Continue)

(Continuation)

Health recommendations
Protect simulators with plastic film and, after its use, proceed to the sanitization with neutral water and soap and/or product recommended by the manufacturer.
Guide the technical team, as well as those responsible for cleaning, regarding the hygiene procedures (current and terminal cleaning, cleaning of simulators and equipment of the skills lab).
Install devices for the alcohol gel deposit in different laboratory spaces and simulation centers.
Expand the number of sinks in the dependencies of skill labs and simulation centers and encourage their use.
Perform frequent testing of teachers and laboratory technicians, especially those in risk groups and or with active participation in the front line in the fight against COVID-19.

Source: Research data, 2020.

Material and human resources

All possible modifications/changes in the formats of simulated clinical experiences are aligned among teachers, students, technicians and managers. To this end, a schedule of working meetings be established[15].

Try to identify the institution's potential, weaknesses, human and material resources, the laboratory and/or simulation center. This identification will help in the construction of a proposal and execution of the project. At EMCM, the faculty has access to an online catalog for all materials and equipment of the laboratory and clinical simulation skills. This strategy can be interesting and facilitate this identification work.

It is also indispensable to have common sense and prudence in order to exercise solidarity at this time. It is undeniable that more resources need to be guaranteed and made viable. Adaptations to the new reality imposed by COVID-19 will require extra investments, which implies compatible planning and budgeting.

Skill training and simulation of low fidelity/medium and high fidelity

Clinical simulation can be used for a variety of teaching and learning objectives, which are not limited to the development of technical skills and concepts, but above all integrate technologies, competencies, skills and teamwork in solving problem situations and developing clinical reasoning[16-19]. It comprises the development of psychomotor skills and the interaction between the cognitive and affective domains. It involves and creates opportunities for the active participation of the learner with consequences determined by the inherent variables of the situation. It is the way to experience teaching and evaluation, in a safe environment, which integrates theory and practice[20-21].

In the clinical simulation, apprentices are not mere consumers, but mainly active instruments and participants in the knowledge construction process, with expectations perceived and defined based on past experiences or information gathered.[22-23] Based on these items, it is important to create skills and scenarios that maintain such particularities and provide simulated clinical experiences of teaching or evaluation accordingly.

The skills come from a composition of knowledge when allied to personal abilities can be conventionally seized. Usually they are linked to the manual dexterities that when added when wanting to do (attitudes) and information about the subject (knowledge) form the competencies. Some scholars also point out that it is impossible to differentiate a skill from a specific skill and that the skills experienced become skills[24-26]. However, it stands out in this moment of resigning the teaching and learning process to the need for creativity from the technological and remote possibilities for the development of skills, taking behaviors and consequently skills for professional exercise.

Affective skills usually involve emotions, feelings of agreement or rejection, which will be learned continuously throughout the course[27,28], but can be awakened with the assistance of a video, an online interview with a distant relative, a digital data collection, an interview with a professional in the field. At this time, considering the development of empathy and communication skills, it is possible to think of participating remotely with a preceptor or teacher who is in the field of a death communication or the general state of a sick person, which could also compose the development of social skills, which involve interpersonal relationships in order to gather positive aspects and minimize negative aspects[29] and communication skills with the patient, family and other professionals. Communication is a skill of reciprocal reach of information, ideas and emotions, between an emitter and a receiver[30]. In this way there is the possibility of involving verbal and non-verbal communication and the strategies used could be resumed at various moments of the formation.

Management skills involve personal, interpersonal and organizational norms and characteristics, involve leadership, effective communication, decision making, and knowledge and are translated into technical, human, conceptual skills, with different importance to institutions[31-32]. In this context, they can be transferred to the proposed objectives, results and recovery strategies. The motor skills related to training, control, effective practice, structured, well instructed, repeated[33-34], can be developed in the Skills and Simulation laboratories, in individualized practices, with the help of a checklist and instructional videos.

The checklists containing the lists of tasks and subtasks to be performed can direct the execution and/or guide in assisting a video with implicit skills. Knowledge and skills will only gain meaning when employed in practice. However, they are still quite enthroned between teachers and students through conceptualization on performance, which has its origin in behaviorism (behavioral). However, it is important to point out that there are many criticisms to checklists, for the merely technical attribution and a decontextualized approach, reducing learning to the fulfillment of atomized tasks[35]. In individual practice, skills training can be recorded so that the facilitator and/or the student himself with the support of the checklist can jointly perform analysis for feedback. Feedback is indispensable for professional development and its inadequacy or non-fulfillment causes demotivation[30,36].

Evaluation

One of the challenges of health education institutions is evaluation, mainly in a somative way. The evaluation must also incorporate innovative elements, it must be fair, interactive, competency-based, integrated and interdisciplinary[37].

In this perspective, in institutions that adopt the model of an evaluation using the OSCE or CSA, it is pertinent to think about integrating the elements previously listed. A single exam per semester, which promotes the integration of modules and different disciplines, may be timely and prudent. In addition, it is important to think about other evaluation strategies for the composition of a final grade or concept.

The concept of flexibility can and should be taken into account in the evaluation strategies. In some contexts, allowing the student a second chance - when there is unsatisfactory performance - can be cautious and responsible.

OSCE and CSA Web

The OSCE and the CSA are the two most commonly used evaluations in the context of clinical simulation. In this perspective, given the current reality, the possibility and adaptations of these exams have been discussed, especially when considering human and material resources, as well as the current health recommendations. Thus, there has been a discussion on the realization of the OSCE Web and remote CSA.

It is important to note that there are reports of using the OSCE Web prior to the COVID-19 pandemic. In the United States, specifically at the University of Pittsburgh, this evaluation format has been in use for some time. In a study that compared performance between students who took

the face-to-face exam and those who participated in the online exam, a significantly lower score was identified, in most of the categories assessed, among face-to-face students[39].

In Qatar, an experiment with OSCE Web was recently developed. Although with a small sample in the pilot project experimentation, the feedback was encouraging[40]. For the face-to-face format, it is essential to consider the health recommendations of health and education agencies such as WHO, Ministry of Health and Ministry of Education, in the Brazilian case.

Even in the context of a pandemic, it is possible to conduct face-to-face evaluations. Duke-National University Singapore, released an unprecedented experience with OSCE implementation during the pandemic. According to the authors, there was no record of infections. However, they emphasize the need to follow all health recommendations for the examination[41].

Personal hygiene control, checking vital signs - especially temperature - of participants (teachers, students and technicians), presenting recent travel statements, cleaning the spaces in the skills lab and/or simulation center, ensuring the distribution and proper use of PPE, organizing students into small groups, keeping distance between assessors and assessors, using digital technologies for scoring and feedback, creating independent circuits, and taking the exam in more than one day or periods may be necessary for conducting face-to-face assessments[41].

It is also important to highlight, now more than ever, the need to plan objective and time-sensitive stations. This planning will allow students to stay as little as possible in the laboratory and/or simulation center. When pertinent, the use of filmed stations - without the need of an evaluator at the moment of the evaluation - for punctual activities such as the request of biochemical exams, interpretation of images, can be considered.

The CSA, for working with the evaluation of multiple skills, in long cases, may be feasible for single evaluations when the option of an evaluation per semester is made (uniting all modules and subjects).

In the experiences with OSCE and/or virtual CSA, it is important to compare these exams in the face-to-face mode in order to better understand and identify which situations these two modalities may be most appropriate[42].

Common recommendations

Regardless of the type and purpose of the simulated clinical experience - or clinical simulation session - it is essential to have the support of professors with expertise in simulation, expertise in the area covered by the session, and to have the support of technicians and/or collaborators from the skills lab and/or simulation center. The assistance of monitors can also be important.

In addition, it is important to identify the knowledge and skills of teachers with the use of new technologies, familiarity with transmission applications and online meetings, development of electronic checklist, among others. As much as a large is to be sure of the skills, abilities and learning objectives related to the activities to be developed by teachers and students. These variables can be determinant during the planning, execution and evaluation of the activities designed in the skills lab and clinical simulation.

It is also important to pilot the scenarios. After the project is finished, this test is important to find out if all the elements of the simulation session are in harmony and if the objectives of the simulation can be reached[16].

For the activities of recording, image transmission and/or simulations, in synchronous or asynchronous format, good quality internet access, the acquisition and use of audio and video capture equipment, as well as the support of specialized technicians are indispensable.

Strategies to support simulated clinical experiments

The use of videos facilitates of teaching learning, because it attracts learners, introduces new issues and brings greater meaning to the objects of study[43]. They start from concrete objects to transport ideas, concepts, reaching several senses at the same time, usually unconsciously, which mobilizes affectivity[44]. It brings static, dynamic, experiences of temporality, of characters,

characteristics, imperceptible details to everyday life, which can be narrated more effectively and anchor the process of meaning. Music, sounds and associated effects stimulate, seduce and combine reaching the sensory, the emotional, the rational and the intuitive[43]. Simulation imitates reality, and allows numerous development possibilities - from training to evaluation - as long as methodological principles are guaranteed.

It is increasingly necessary to think of educational practices databases, which can be shared, accessed and updated and regularly used even between institutions. Their sharing using technology, is at the heart of Learning Design studies. In the context of the pandemic the same video can be accessed in different institutions and by other sciences, occasions and contexts that will have the opportunity to try them, modify them and improve them[45,47].

If it is relevant to reinforce the ethical precepts regarding the use of images and videos, it is therefore prudent to request the authorization of the participants by signing an "Image Use Authorization Term" with information on the strategy, general aspects of display; the recommendation not to make interpretations disassociated from the learning objectives, and not to make a pretrial. As guidance, the teacher is recommended to assist students in advance, write down the points of greatest interest, use identification resources in relevant scenes, make sure that all assistance has the necessary resources for attendance, moderate the discussions after the scenario is made in order to identify practical applications, meanings, improvements[43].

Although this is possible, there are also recommendations from international associations not to share these materials - from ensuring the confidentiality of data[16]. Therefore, this is an important point for teachers and institutions to reflect and make their choices based on the real needs and ethical issues surrounding this discussion.

The videos of laboratory activities are artifacts of reflection during debriefing or feedback, and can be used in the processes of evaluation (formative or summative) of students and professionals in improvement, both in the training of skills, and in developing skills[48,49]. They allow the increase of motivation, the satisfaction of apprentices and can be seen on mobile devices and disseminated in various media, expanding access outside the classroom and laboratories[50]. It is also worth remembering that the quality of the footage is relevant to foster student interest[51].

In the skills and simulation laboratories, monitoring is a teaching and learning modality defined as a process by which the student monitors act as facilitators of skills and competence practices and other students of training. The proximity facilitates the process that the student monitor has with the other students, such as issues related to age, experience of practice fields, which provides an affinity in the contact established. In order to exercise this role, the monitors must receive preparation both in the activities and in the formal aspects of use of resources and spaces. Monitoring is also a moment of study and training for the student monitors[52,54].

Basic clinical integration is not a new strategy[55], and have a degree of relevance for including a high degree of intellectuality in clinical discussions. However, they have been increasingly stimulated by the principle of interdisciplinarity and clinical reasoning development. In this way, including in the laboratories of skills and simulation stations of the basic area, analysis of materials, drugs, images and anatomy, among others, can reinforce not only the understanding of students, but also stimulate the joint work of teachers and facilitators, besides optimizing human resources and materials. One of the impediments for its non accomplishment is the coincidence of schedules between professors and students, what in the time of pandemic and of a larger contingent of asynchronous classes can be solved and become a promising form of activity for the post-pandemic.

The preceptor is usually the professional who carries out the teaching-service interaction and becomes responsible for linking the skills acquired to the clinical context, with well-established goals and objectives, but who has relevant knowledge and dexterity in the skills directly linked to the professional development of the apprentice[56]. In this context, approaching the preceptor to simulated practices is a strategy of great value, since it has great practical knowledge of the facilities and difficulties encountered in everyday life. Thus, his participation in the training

through clinical simulation allows him to become an excellent facilitator or an excellent evaluator.

Regarding the academic leagues, although many researchers consider their negative points as early specialization, the formation of a hidden curriculum, it is recognized the strong influence they have among students and the motivation for their participation[57]. In the current context, students and tutors with specific and specialized knowledge in the subject have been participating in the production of videos and other didactic materials, which can complement the use of skills laboratories and simulation. Such strategies encourage collective involvement in the construction of a new routine and practice of study, which often rely on interdisciplinary knowledge and constitutes, in the near future, a new possibility for teaching and sharing knowledge.

Health recommendations and protocols

In this article, the authors point out some recommendations that may be useful for the return of face-to-face activities, mainly in the use of laboratories and clinical simulation centers, a practice indicated in the context imposed by COVID-19. Some of the suggested guidelines require changes in the environment and physical structure.

Specifically on the cleaning of simulators, the recommendation is the use of water and neutral soap. However, it is important to consult the supplier companies and observe the technical specifications of each product and brand[11].

Another point that needs to be highlighted is the guarantee of testing for COVID-19, even in asymptomatic, among teachers and collaborators of health courses that work in the front line of the pandemic, and that will develop face-to-face activities in skills labs and simulation centers. It is worth mentioning that a double journey can be potentially dangerous in the sense of exposure to risk and transmission of the disease, so it is recommended to analyze the work activities in order to reduce such exposure.

Study limitations: It is noteworthy that they deal with general recommendations, based on protocols, guidelines and plans to resume the practical activities of institutions linked to researchers, as well as the opinion of experts in the area of teaching simulation. Thus, these guidelines should be discussed and adapted according to the different realities, updating health and education agencies' guidelines, and monitoring the behavior of the pandemic caused by the coronavirus worldwide.

FINAL CONSIDERATIONS

In this article, the possibilities of the skills laboratory and clinical simulation during the COVID-19 pandemic were discussed in order to point out and suggest adaptations related to particularities of the pandemic and recommendations for reopening and operation. In addition to the health recommendations, pedagogical strategies were suggested for health teachers and managers of skills labs and clinical simulation centers.

REFERENCES

1. Verma S, Manjunath SM, Ettishree, Singh A, Srivastava M, Sahoo KK, Vinuta S, Singh U. Coronavirus: An emergency for healthcare professionals. J Family Med Prim Care. 2020;9(4):1815-1819. https://doi.org/10.4103/jfmpc.jfmpc_462_20
2. Rajendran DK, Rajagopal V, Alagumanian S, Santhosh Kumar T, Sathiya Prabhakaran SP, Kasilingam D. Systematic literature review on novel corona virus SARS-CoV-2: a threat to human era. Virusdisease. 2020;31(2):161-173. https://doi.org/10.1007/s13337-020-00604-z
3. World Health Organization. Situation Report – 181; 2020. Available in: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200719-covid-19-sitrep-181.pdf?sfvrsn=82352496_2
4. Ali I, Alharbi OML. COVID-19: Disease, management, treatment, and social impact. Sci Total Environ. 2020;728:138861. https://doi.org/10.1016/j.scitotenv.2020.138861
5. Ouassou H, Kharchoufa L, Bouhrim M, Daoudi NE, Imtara H, Bencheikh N, ELbouzidi A, Bnouham M. The Pathogenesis of Coronavirus Disease 2019 (COVID-19): Evaluation and Prevention. J Immunol Res. 2020;2020:1357983. https://doi.org/10.1155/2020/1357983
6. Nussbaumer-Streit B, Mayr V, Dobrescu AI, Chapman A, Persad E, Klerings I, et al. Quarantine alone or in combination with other public health measures to control COVID-19: a rapid review. Cochrane Database of Systematic Reviews. 2020; 4. https://doi.org/10.1002/14651858.CD013574.

7. Sheikh A, Sheikh A, Sheikh Z, Dhami S. Reopening schools after the COVID-19 lockdown. J Glob Health. 2020;10(1):010376. https://doi.org/10.7189/jogh.10.010376

8. Lawrence K, Hanley K, Adams J, Sartori DJ, Greende R, Zabar S. Building telemedicine capacity for trainees during the novel coronavirus outbreak: a case study and lessons learned. J Gen Intern Med. 2020. https://doi.org/10.1007/s11606-020-05979-9.

9. Seymour-Walsh AE, Bell A, Weber A, Smith T. Adapting to a new reality: COVID-19 coronavirus and online education in the health professions. Rural and Remote Health. 2020;20: 6000. https://doi.org/10.22605/RRH6000

10. Costa RRO, Medeiros SM, Martins JCA, Enders BC, Lira ALBC, Araújo MS. Simulation in nursing teaching: A Conceptual Analysis. Rev Enferm Cent Oest Min. 2018;8:e1928. https://doi.org/10.19175/recom.v7i0.1928

11. Ingrassia PL, Capogna G, Diaz-Navarro C, Szyld D, Tomola S, Leon-Castelao E. COVID-19 crisis, safe reopening of simulation centres and the new normal: food for thought. Adv Simul. 2020; 5(13). https://doi.org/10.1186/s41077-020-00131-3

12. Wong J, Goh QY, Tan Z, Lie SA, Tay YC, Yi NG, et al. Preparing for a COVID-19 pandemic: a review of operating room outbreak response measures in a large tertiary hospital in Singapore. Can J Anesth/J Can Anesth. 2020;67:732–45. https://doi.org/10.1007/s12630-020-01620-9

13. Carenzo L, Costantini E, Greco M, Barra VR, Mainetti RM, Zanella G, et al. Hospital surge capacity in a tertiary emergency referral centre during the COVID-19 outbreak in Italy. Anaesthesia; 2020. https://doi.org/10.1111/anae.15072

14. Kanneganti A, Sia C, Ashokka B, Ooi SBS. Continuing medical education during a pandemic: an academic institution's experience. Postgraduate Medical Journal. 2020;96:384-386. http://dx.doi.org/10.1136/postgradmedj-2020-137840

15. Shehata MH, Prabu KA, Arekat MR, Atwa H, Ahmed SA, Deifalla AH. Twelve tips to successfully conducting virtual clinical assessment using Zoom™ Lessons learned from COVID-19 pandemic. Preprints. 2020; 2020060171. http://dx.doi.org/10.20944/preprints202006.0171.v1

16. National League for Nursing. Simulation Innovation Resource Center Glossary. Available from: http://www.sirc.nln.org/mod/glossary/view.php

17. Jeffries PR, Rizzolo MA. Designing and implementing models for the innovative use of simulation to teach nursing care of ill adults and children: A national, multi-site, multi-method study. New York (NY): National League for Nursing; 2006.

18. Jeffries PR. The NLN Jeffries simulation theory. Wolters Kluwer: National League for Nursing; 2016.

19. McCOY CE, Menchine M, Anderson C, Kollen R, Langdorf M, Lotfipour S. Prospective randomized crossover study of simulation vs didactics for teaching medical students the assessment and management of critically ill patients. J Emerg Med. 2011;40(4):448-55. https://doi.org/10.1016/j.jemermed.2010.02.026

20. Bastable SB. O enfermeiro educador: princípios de ensino-aprendizagem para a prática de enfermagem. Porto Alegre: Artmed; 2016.

21. Decker S, Sportsman S, Puetz L, Billings L. The evolution of simulation and its contribution to competency. J Journal of continuing education in nursing. J Contin Educ Nurs. 2008;39(2):74-80. https://doi.org/10.3928/00220124-20080201-06.

22. Lemos SIM. Análise da satisfação de estudantes num curso em e-learning no ensino superior [dissertação]. Lisboa: Instituto de Educação, Universidade de Lisboa; 2011.

23. Kootler P, Clarke RN. Markenting for health care organizations. New Jersey (US): Prentice-Hall; 1987.

24. Rabaglio MO. Ferramentas de avaliação de performance com foco em competências. Rio de Janeiro (RJ): Qualitymark; 2004.

25. Antunes C. Como desenvolver competências em sala de aula. Petrópolis (RJ): Vozes; 2001.

26. Brasil. Ministério da Educação. Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira. Exame Nacional do Ensino Médio (Enem): fundamentação teórico-metodológica. Brasília: MEC/INEP; 2005.

27. Bloom BS, Krathwohl DR, Masia BB. Taxonomia de objetivos educacionais: domínio afetivo. Porto Alegre: Globo; 1973.

28. Bordenave JD, Pereira AM. Estratégias de ensino-aprendizagem. 7ª ed. Petrópolis (RJ): Vozes; 1985.

29. Bolsoni-Silva AT, Carrara K. Habilidades sociais e análise do comportamento: compatibilidades e dissensões conceitual-metodológicas. Psicol Rev. 2010; 16(2): 330-350. Available from: http://pepsic.bvsalud.org/scielo.php?script=sci_arttext &pid=S1677-11682010000200007

30. Consoni B. A importância do feedback [monografia]. São Paulo (SP): Fundação Educacional do Município de Assis; 2010.

31. Ouverney AM, Noronha JC. Modelos de organização e gestão da atenção à saúde: redes locais, regionais e nacionais. In: Fundação Oswaldo Cruz. A saúde no Brasil em 2030 - prospecção estratégica do sistema de saúde brasileiro: organização e gestão do sistema de saúde. Rio de Janeiro: Fiocruz; 2013. p. 143-182.

32. Freitas PFP, Odelius CC. Competências gerenciais: uma análise de classificações em estudos empíricos. Cad EBAPE.BR. 2018; 16(1). Available from: http://bibliotecadigital.fgv.br/ojs/index.php/cadernosebape/article/view/59497

33. Clark JE. On the problem of motor skill development. Journal of Physical Education, Recreation and Dance. 2007; 78(5): 39-45. https://doi.org/10.1080/07303084.2007.10598023

34. Cotrim JR, Lemos AG, Néri Júnior JE, Barela JA. Desenvolvimento de habilidades motoras fundamentais em crianças com diferentes contextos escolares. Rev Educ Fis UEM. 2011; 22(4): 523-533. https://doi.org/10.4025/reveducfis.v22i4.12575

35. Aguiar AC, Ribeiro ECO. Conceito e Avaliação de Habilidades e Competência na Educação Médica: Percepções Atuais dos Especialistas. Rev Bras Educ Med. 2010; 34(3): 371-378. http://dx.doi.org/10.1590/S0100-55022010000300006.

36. Moreira, LM, Mennin RHP, Lacaz FAC, Bellini VC. Ligas Acadêmicas e Formação Médica: Estudo Exploratório numa Tradicional Escola de Medicina. Rev Bras Educ Med. 2019; 43(1): 115-125. https://dx.doi.org/10.1590/1981-52712015

37. Amin H, Shehata M, Ahmed S. Step-by-step Guide to Create Competency-Based Assignments as an Alternative for Traditional Summative Assessment. MedEdPublish. 2020; 9(1): 120. https://doi.org/10.15694/mep.2020.000120.1

38. Ahmed S, Shehata M, Hassanien M. Emerging Faculty Needs for Enhancing Student Engagement on a Virtual Platform. MedEdPublish. 2020; 9(1). https://doi.org/10.15694/mep.2020.000075.1

39. Novack DH, Cohen D, Peitzman SJ, et al. A pilot test of WebOSCE: a system for assessing trainees' clinical skills via teleconference. Med Teach 2002;24:483–7. https://doi.org/10.1080/0142159021000012504.

40. Major S, Sawan L, Vognsen J, Jabre M. COVID-19 pandemic prompts the development of a Web-OSCE using Zoom teleconferencing to resume medical students' clinical skills training at Weill Cornell Medicine-Qatar. BMJ Simul Technol Enhanc Learn. 2020. https://doi.org/10.1136/bmjstel-2020-000629

41. Boursicot K, Kemp S, Ong T, Wijaya L, Goh SH, Freeman K, Curran I. Conducting a high-stakes OSCE in a COVID-19 environment. MedEdPublish, 2020; 9. https://doi.org/10.15694/mep.2020.000054.1

42. Shehata MH, Prabu KA, Arekat MR, Atwa H, Ahmed SA, Deifalla AH. Twelve tips to successfully conducting virtual clinical assessment using Zoom™ Lessons learned from COVID-19 pandemic. *Preprints;* 2020. https://doi.org/10.20944 / preprints202006.0171.v1

43. Moran J. O vídeo em sala de aula. Comum & Educ. 1995; 2:27-35. Available from: http://www.eca.usp.br/prof/moran/site/textos/desafios_pessoais/vidsal.pdf

44. Arroio A, Giordan M. O vídeo educativo: aspectos da organização do ensino. Química Nova na Escola. 2006; 24: 8-11. Available from: http://www.lapeq.fe.usp.br/meqvt/disciplina/biblioteca/artigos/arroio_giordan.pdf

45. Bassani PBS, Lima C, Dalanhol D. Documentação e compartilhamento de atividades de aprendizagem: um estudo sobre repositórios de prática e artefatos de mediação. Revista e-Curriculum. 2016; 14(4): 1423-1453. Available from: https://revistas.pucsp.br/curriculum/article/view/23819/21874

46. Bassani PBS, Barbosa DNF, Eltz PT. Práticas pedagógicas com a web 2.0 no ensino fundamental. Esp Pedag. 2013; 20(2): 286-300. http://dx.doi.org/10.5335/rep.2013.3556

47. Conole G. Capturing practice: the role of mediating artefacts in learning design. In: Lockyer L. Handbook of research on learning design and learning objects. Hersey (PA): IGI Global, 2008. p. 187-207.

48. Sawyer T, Sierocka-Castaneda A, Chan D, Berg B, Lustik M, Thompson M. The effectiveness of video-assisted debriefing versus oral debriefing alone at improving neonatal resuscitation performance: a randomized trial. Simul Healthc. 2012;7(4): 213-21. http://dx.doi.org/10.1097/SIH.0b013e3182578eae

49. Skare C, Calisch TE, Saeter E, Rajka T, Boldingh AM, Nakstad B, et al. Implementation and effectiveness of a video-based debriefing programme for neonatal resuscitation. Acta Anaesthesiol Scand. 2018;62(3):394-403. http://dx.doi.org/10.1111/aas.13050

50. Arruda FT. Elaboração de vídeos médicos educacionais. Rev Bras Educ Med. 2012; 432(3): 431-435. http://dx.doi.org/10.1590/S0100-55022012000500019

51. Ha E. Attitudes toward Video-Assisted Debriefing after simulation in undergraduate nursing students: an application of Q methodology. Nurse Educ Today. 2014; 6(34): 978–84. https://dx.doi.org/10.1016/j.nedt.2014.01.003

52. Galdino ETS, Abrantes KNFC. Desafios da monitoria acadêmica: percepção dos alunos monitores e monitorados. Encontro de Extensão, Docência e Iniciação Científica. 2018;5(1). Available from: http://publicacoesacademicas.unicatolicaquixada.edu.br/index.php/eedic/article/view/3061

53. Silva RO, Belo AR. A eficácia da monitoria no processo de aprendizagem visando a permanência do aluno na IES. Rev Inter Pens Cient. 2012; 1(2): 231-238. https://dx.doi.org/10.20951/2446-6778/v1n2a16

54. Duran D, Vidal V. Tutoria: aprendizagem entre iguais. Porto Alegre: Artmed; 2007.

55. Lazarini CA, Goulart FC. Integração básico-clínica no internato médico: Psiquiatria e Farmacologia. Rev Bras Educ Med. 2013; 37(3): 343-349. https://dx.doi.org/10.1590/S0100-55022013000300006

56. Botti SHO, Rego S. Preceptor, supervisor, tutor e mentor: quais são seus papéis? Rev Bras Educ Med. 2008; 32(3): 363-373. http://dx.doi.org/10.1590/S0100-55022008000300011

57. Moreira LM, Mennin RHP, Lacaz FAC, Bellini VC. Ligas Acadêmicas e Formação Médica: Estudo Exploratório numa Tradicional Escola de Medicina. Rev Bras Educ Med. 2019; 43(1): 115-125. https://doi.org/10.1590/1981-52712015v43n1rb20170141

Corresponding Author:
Raphael Raniere de Oliveira Costa.
raphaelraniere@hotmail.com

Editor:
Prof. Dr. Felipe Villela Gomes

Received in: nov 3, 2020
Approved in: dec 14, 2020