

A paradigm shift in education

Cambio de paradigma en la educación

Rosa Ma. Guzmán Aguilar,^{*} José Arturo Vázquez,[‡] Abilene Escamilla Ortiz[§]

Keywords:

Distance education, simulation, information and communication technology, learning, information society, e-learning in medical education.

Palabras clave:

Educación a distancia, simulación, tecnologías de la información y comunicación, aprendizaje, sociedad de la información, e-learning en educación médica.

ABSTRACT

Learning during the pandemic has taken a turn from one day to the next. Accelerated technological changes have generated a “new normality”, have made necessary the efficient use of information and communication technologies as well as simulation in medical and surgical education. The evolution of virtual spaces is not simple; it implies the adoption of new teaching-learning processes. Distance education is an opportunity, thus making it possible not to suspend academic activities and to optimize the availability of time. Clinical and surgical simulation, which can help to replace internships, is carried out on planned and structured scenarios like reality. It allows to evaluate the student through an intervention with him/her to know his/her mistakes and successes, all this through the analysis of the use of captions. Social networks can be used for teaching. Now it is possible to easily watch and listen to virtual conferences, congresses, and so forth. To continue the teaching of residents, the classroom has been moved to virtual sessions, and to complement it, you can have a repository of videos, closed Facebook[®] groups where you can interact with residents through questions, questionnaires, or through topics for discussion. The global trend is to increase the academic load outside the traditional classroom, that is, in virtual spaces that link simulation, and take advantage of information and communication technologies.

RESUMEN

El aprendizaje durante la pandemia ha dado un giro de un día para otro, los cambios tecnológicos acelerados han generado una “nueva normalidad” y han hecho que se tenga que utilizar de manera eficiente las tecnologías de la información y comunicación, lo mismo que la simulación en educación médica y quirúrgica. La evolución de los espacios virtuales no es sencilla, acarrea adopción de nuevos procesos de enseñanza-aprendizaje. La educación a distancia es una oportunidad, logrando así no suspender actividades académicas y optimizar la disponibilidad del tiempo. La simulación clínica y quirúrgica, la cual puede ayudar a sustituir las prácticas, se lleva a cabo sobre escenarios planeados y estructurados de forma similar a la realidad. Permite evaluar al alumno a través de una intervención con él para hacerle saber sus errores y aciertos, todo esto mediante el análisis del uso de rúbricas. Las redes sociales se pueden utilizar para la educación, se pueden ver y escuchar conferencias virtuales y congresos. Para continuar la enseñanza con los residentes, se pasó del aula a las sesiones virtuales, para complemento se puede tener un repositorio de videos, grupos cerrados de Facebook[®] donde se puede interactuar con los residentes a través de preguntas, cuestionarios o poner temas a debate. La tendencia mundial es incrementar la carga académica fuera del aula tradicional, es decir, en espacios virtuales que vinculen la simulación y exploten al máximo las tecnologías de la información y comunicación.

* Coordinator of Virtual Academy, Mexican Association of General Surgery. Mexico City, Mexico.

‡ Coordinator of the Medical Career of the Universidad IEST-Anáhuac. Tampico, Tamaulipas.

§ Editor, Cirujano General Journal. Mexico City, Mexico.

Received: 06/15/2020
Accepted: 07/07/2020



INTRODUCTION

The objective of this paper is to discuss the urgent positioning of learning in virtual spaces in a knowledge-based society overwhelmed by accelerated technological changes and epidemiological events that have generated a “new normality” associated with abrupt economic, techno-scientific, social and political movements, among others,

which require the efficient use of information and communication technologies as well as simulation in medical and surgical education.

Change as a primer in education

Never as today, in this globalized world, has the need for change been so necessary to give continuity to processes. The economic, political, and social phenomena of our time

How to cite: Guzmán ARM, Vázquez JA, Escamilla OA. A paradigm shift in education. Cir Gen. 2020; 42 (2): 132-137.

have radically transformed the environment, impose new challenges, a greater demand for human capital and the necessity of quality collaborative work. Facing this overview, education does not escape this reality and acts accordingly with the implementation of new educational paradigms, with which we are not only fostering a better future, but more importantly, they are transforming the present.

Globalization and the vertiginous development of information and communication technologies (ICT's) have generated a dependence on immediacy and thus on technological tools. Nowadays, none of us can imagine ourselves without the use of cell phones that allow us to contact individuals in distant locations and at the same time this same cell phone informs us of the relevant news of the day, the state of the weather, changes in the stock market or makes us participants, in just minutes, in virtual communities through social networks such as Facebook, Twitter, WhatsApp, etc. We wander amid knowledge, culture, and the commercialization of leisure, where technology intermingles and exploits them in a multiplicity of modalities, through which social networks, videos, television, or video games contribute to teaching, stimulate the resolution of educational problems and, in turn, to entertainment.

Social and economic needs demand radical changes in the way of facing challenges, making decisions, and solving problems. Therefore, education has shifted to a position where the student is the main protagonist of the teaching-learning process, manager of the construction of their knowledge, autonomous and responsible for meeting their training needs, motivated to land their life project as a happy individual in constant improvement to transform their environment into a harmonious one allowing them to achieve their goals as well as personal and collective welfare.

Under this perspective, online education arises as a response to the demands of globalization, technocracy and a knowledge society that requires human capital with systemic thinking associated with cognitive skills, abilities and positive attitudes that respond to the requirements of the labor sector.

Notwithstanding the above, in Mexico the educational paradigm in virtual spaces

and its actors (teachers, students, educational institutions, community, etc.) is negotiating the learning curve with different degrees of maturity, with staggered and non-uniform advances among the different socioeconomic strata within the country.

Evolution and relevance in distance education (DE)

War and pandemics share the need to strengthen the labor force and innovation through the construction of new knowledge and forms of employability to avoid economic recession. By this precept, innovations in technologies for education in virtual spaces point towards an educational revolution that demands relevance in the structuring of contents based on contextualized scenarios, emerging needs of change and above all, that foster visualizing and foreseeing future events.

The evolutionary process of virtual spaces is not simple, since it entails the adoption of diverse behavioral patterns as well as of the teaching-learning process itself, since the crossing of such space gives rise to submerging in areas of possible misunderstandings between the contributions and perceptions of the instructor and the student, since the psychological and communication spaces between student and instructor are never exactly the same, due to that even in face-to-face education there is a certain transactional distance that needs to be narrowed.¹ Therefore specific strategies and techniques for learning in DE show distinctive psycho-pedagogical and instructional concepts that transform the role of the teacher into a facilitator and even more into a catalyst for the individual requirements of the learner, as well as for stimulating interactions among the members of the learning team.

Although the massification of DE in the surgical field is focused on solving the growing demand for continuous training or updating programs as well as taking advantage of the vertiginous technological advances of the 21st century, it implies a great challenge, since it requires having the appropriate infrastructure, qualified personnel in education, information, and communication technologies, as well as

continuous maintenance of the platform and incorporation of new learning objects.

The elements with the greatest impact on DE are the design of the program, the exploitation of diverse media and resources, as well as communication styles, emotional characteristics, personality type and learning styles of the students to promote creativity, self-regulation, commitment, and responsibility of the teacher-student binomial.

The “new normal” as an opportunity to embrace change in education

Commotion originated by COVID-19 in the world, and undoubtedly in the educational sector, opens a great opportunity to globally adopt the biggest change in DE in history and thus address in our favor the circumstances of confinement as well as to reduce the suspension of academic activities and optimize the availability of time.²

This unexpected and abrupt reality embedded in a multiplicity of perceptions of the environment immerses us in a dance of emotions, which move between fear and uncertainty due to the perpetuation of the traditional methods of information transmission and reproduction of obsolete constructs that prevail in our educational system, ranging from the basic to the postgraduate level. The “new normality” invites us to give meaning to the priority, emergent, novel, and effective concepts to become different observers of reality, open to change and challenging to bring out latent competencies making synergy of talents to promote collaborative work for the conversion of threats into opportunities.

This “new normality” converging with DE breaks down the barriers of time and space, brings the population individually and collectively closer to a gamification of audiovisual contact that undoubtedly overcomes isolation;³ positions the subject as a protagonist, responsible for his/her learning and promoter of conversations that germinate harmonious and friendly mental scenarios for interaction and exchange of experiences that encourage atmospheres of belonging and achievement for assertive decision-making

opening up new ways of facing the complexity of the current situation.

In the present century, medical education is undergoing interesting and decisive changes associated with advances in knowledge and technology; epidemiological evolution and patients’ demands have led institutions to reformulate the way they teach medicine.¹

Simulation as an educational strategy in times of COVID-19

In these times of educational crisis caused by the COVID-19 virus pandemic, virtual resources have been sought to cover the lack of presence of students at the universities; in addition to this, the concern arises as to how to address the clinical practice.⁴

Although DE represents a relevant tool in the learning and evaluation of theoretical concepts and skills such as communication, leadership, and decision making, among others, the training of new surgeons faces important challenges in the acquisition of competencies in clinical practice and surgical skills, where clinical simulation is an important element for teaching.⁵

Clinical simulation is a discipline that is defined as a set of methods that facilitate the acquisition of skills and abilities by doctors in training in scenarios like real life in a safe learning environment with the aim of not putting patients at risk. Currently, this discipline represents one of the teaching strategies that allows a medical student or resident of any specialty, facing planned scenarios, designed, and structured in a similar way to reality, to strengthen the development of skills, attitudes, and aptitudes with the objective of maintaining the humanization of medical practice, and above all, the safety of patients by promoting teamwork.

It is important to point out that the implementation of clinical simulation does not turn its back on the face-to-face teaching processes in medical and surgical education, nor does it replace the practice with the real patient. On the contrary, it represents a complement and a link between the basic science phase and the clinical phase, acting as a bridge between the theoretical and the

practical, with the advantage of being able to repeat a procedure as many times as necessary until it is mastered and then perform it safely with less complications in the real patient. It undoubtedly shortens the learning curve and through debriefing (conversation between two or more people to review the simulated event), the student may explore and analyze his/her actions, discovers the error, reflects on his emotional states, and obtains new information to improve his performance in real situations.^{6,7}

In these times of confinement, we should not make the mistake of thinking that simulation can fully replace surgical practice with patients in real scenarios; However, simulation centers promote the development of skills and abilities in an efficient manner, given that they have controlled and contextualized spaces that allow the student to be present in person and adopt themes centered on “doing” and showing “how to do it” based on the evidence of superior aptitude established in Miller’s pyramid of knowledge, which is why they constitute an efficient solution to the impediment of student presence and for clinical practice in current times of pandemic.

By the afore mentioned, many questions arise about the field of action and contribution of clinical simulation for the development of surgeon competencies in times of pandemic. In this regard, low fidelity simulation requires anatomical parts or simulators of specific tasks for knots and sutures, laparoscopy, or anastomosis exercises, among others, which may require the presence of the student all of which can be implemented remotely nowadays. If the resource is at hand, for example, the student or resident may be recorded doing his training box, and the teacher can see what the student has done and make the appropriate recommendations.

On the other hand, there are dynamics such as video sessions, where simulated clinical cases or surgical events can be used to interact remotely to develop clinical reasoning or skills such as decision making. This is known in some media as telesimulation.⁶

Finally we may conclude that although this unexpected battle that healthcare personnel face against COVID-19 is not yet over, the lessons learned have induced us to critically

evaluate the current methods of educational delivery in the face of this uncertain and changing overview,⁸ so it is imperative to live the now with an empowered vision, eager for improvement and enterprising to develop DE and simulation strategies that minimize the interruptions of face-to-face training programs in medical personnel in training with permanent updating in all surgical specialties.

The global trend is to increase the academic load outside the traditional classroom, that is, in virtual spaces that link simulation and make the most of information and communication technologies to build learning experiences at the student’s particular pace and, moreover, that allow him/her to identify the most relevant and timely points to discover or create opportunities for progress and the foundation of new knowledge.

Use of social networks in surgical education

During this pandemic the use of social networks such as Facebook, Twitter, YouTube, Instagram, Snapchat, among others, are the most important source to spread the news about COVID, unfortunately not all news is real. On the contrary, much news are false, and there is much misinformation.⁹ Almost two billion people in the world make use of social networks during the pandemic, which has caused to spend more time in front of the screen. Traditional sales have been replaced by online sales, and teaching has had to be carried out through this modality.¹⁰ Similarly, businesses, if they use them in an intelligent and creative way, can have positive results. New platforms have emerged, such as Tik-Tok and Edu-Tok, which is the educational part. Also, the use of Podcast and Telegram are changing the scenario in social networks.¹⁰

Derived from the pandemic it has been observed that the use of social networks has been useful, especially to provide medical information that is considered true, but it has also fallen into what is now known as infodemia in which false notes prevail, especially because the image of a nurse or a doctor is used to give these notes. That is why platforms such as Facebook, for example, direct the user to the World Health Organization sites for reliable

information. Social networks can be used for education. Through them it is possible to watch and listen to virtual conferences specially to learn about COVID-19 and generate discussion, since several congresses or conferences have been cancelled due to the pandemic.¹¹ What should we do to avoid infodemia? We should follow health authorities and specialists who are recognized and reliable in the information they provide. Information arrives daily to our networks, e-mails, WhatsApp; therefore, we should not recirculate information that has not been verified.¹¹

How can we use technology with residents during this pandemic?

Since the beginning of the pandemic, both the American College of Surgeons and the Mexican Association of General Surgery decided to suspend scheduled surgery, to perform only emergency surgery, not to gather more than 10 people, and to reduce the number of personnel in the operating room. All this has changed the surgical teaching of residents from one day to the next. Some proposals have been made to continue with the same by making use of technology.¹²

When transferring classroom work out of the classroom, you need to properly instruct what you want and encourage student participation with questions and discussion. You can have a repository of videos that the resident can watch later; the videos should be different according to the hierarchy. Another option that was raised was to open a closed Facebook group where daily questions are uploaded to prepare them for their certification exam and to invite them to academic conferences of our association or other surgery-related associations. For classes there are different free platforms that can be used from the cell phone, tablet, or computer. It is recommended to record the sessions so that they remain in the cloud and are available to the residents.¹²

On Twitter there are different surgical education accounts and surgeons who upload their clinical cases, and there is also interaction through opinion; topics and articles that are also uploaded for review and good discussion. This should be generated always trying to

make it evidence-based medicine and surgery. The uploading of cases must be, as we have already described, with the patient's consent, times, etc.

From now on we must consider all the tools we have at hand to innovate in surgical education.

REFERENCES

1. Moore M. Theory of transactional distance. In: Keegan D, ed. *Theoretical principles of distance education*. Routledge; 1997. pp. 22-38. [Consultado el 22 de mayo de 2020] Disponible en: <http://www.c3l.uni-oldenburg.de/cde/found/moore93.pdf>
2. Yan Z. Unprecedented pandemic, unprecedented shift, and unprecedented opportunity. *Hum Behav Emerg Technol* [Internet]. 2020 [Consultado el 26 de mayo de 2020]. Disponible en: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7228313/>
3. Osipov IV, Volinsky AA, Nikulchev E, Prasikova AY. Study of gamification effectiveness in online e-learning systems. *IJACSA* [Internet]. 2015 [Consultado el 26 de mayo de 2020]; 6: 71-77. Disponible en: https://thesai.org/Downloads/Volume6No2/Paper_11Study_of_Gamification_Effectiveness_in_Online_e-Learning_Systems.pdf
4. Díaz-Guio DA, Ferrero F, Vázquez-Vázquez JA, et al. Educación en línea: un camino hacia la formación docente sin fronteras. *Simulación Clínica*. 2019; 1: 121-122.
5. Cabero-Almenara J. Bases pedagógicas del e-learning. *RUSC* [Internet]. 2006 [Consultado el 14 de junio de 2020]; 3. Disponible en: <https://www.redalyc.org/pdf/780/78030102.pdf>
6. Ruiz-Parra AI, Angel-Müller E, Guevara O. La simulación clínica y el aprendizaje virtual. *Tecnologías complementarias para la educación médica*. *Rev Fac Med*. 2009; 57: 67-79.
7. Amaya A. El razonamiento clínico: un objetivo de la educación médica. *Universitas Médica*. 2008; 49: 289-292.
8. Plancher KD, Shanmugam JP, Petterson SC. The changing face of orthopedic education: searching for the new reality after COVID-19. *Arthrosc Sports Med Rehabil* [Internet]. 2020 [Consultado el 26 de mayo de 2020]. Disponible en: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7183965/pdf/main.pdf>
9. Hussain W. Role of social media in COVID-19 pandemic. *Int J Front Sci*. 2020; 4. doi: 10.37978/tijfs.v4i2.144.
10. Ghosh R. Psychological impact of social media during COVID-19 pandemic lockdown. *Int J Mult Edu Research*. 2020 5: 171.
11. Laurentino Lima D, Albanez A de Medeiros Lopes MA, Brito AM. Social media: friend or foe in the COVID-19 pandemic? *Clinics*. 2020; 75: e1953.
12. Chick RC, Clifton GT, Peace KM, Propper BW, Hale DF, Alseidi AA, et al. Using technology to maintain the education of residents during the COVID-19 pandemic. *J Surg Educ*. 2020; 77: 729-732.

Ethical considerations and responsibility:

Data privacy. In accordance with the protocols established at the authors' work center, the authors declare that they have followed the protocols on patient data privacy while preserving their anonymity. The informed consent of the patient referred to in the article is in the possession of the author.

Funding: No financial support was received for this study.

Disclosure: The authors declare that they do not have any conflict of interest in this study.

Correspondence:

Rosa Ma. Guzmán-Aguilar, MD

E-mail: dra.guzman.aguilar@gmail.com

www.medigraphic.org.mx