Innovative educational proposal: telehealth, clinical reasoning and collective construction of knowledge

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Abstract

Introduction: As a result of the new technologies applied to the field of health, a discipline that invites us to redesign assistance, teaching and research has emerged: telehealth. In education, telehealth offers us the possibility of reducing the existing gaps between professional practice and ongoing training. Objective: To share a teaching experience for training residents by means of innovative education processes driven by the new technologies in Argentina. Method: We have carried out a work among medical residencies all over the country making use of video conference, with the object of promoting clinical reasoning as a method of case study and favoring the collective construction of knowledge. Results: A total of nine meetings were held via video conference with the participation of 44 residencies and 200 residents. Thirty-three percent agreed on appreciating that "sharing and knowing how other residents work" was what most called their attention. Firstly, they chose "to continue with clinical reasoning and presenting cases as a central point of discussion". They have linked the experience "with a space for discussion and reflection and with the possibility of creating networks", over other traditional ways of learning. Discussion: Medical teaching may be enriched with the incorporation of the new technologies. We can get involved in a transformative learning, defined by turning away from memorization, and introducing clinical reasoning as an epistemological method; replace the isolated practice with an interconnected team work and, finally, accomplish learning through a cooperative and collaborative knowledge by means of video conference. Conclusion: Exploring the potential telehealth offers postgraduate education will enable to create new innovative learning proposals for health care professionals.
Keywords: *Medical Education; Telemedicine; Telehealth; Videoconference; Clinical Reasoning.*

Resumen

Propuesta innovadora en educación: telesalud, razonamiento clínico y construcción colectiva del conocimiento.
Introducción: Como resultado de las nuevas tecnologías aplicadas al campo de la salud, emerge una disciplina que nos invita a rediseñar la asistencia, la docencia y la investigación: la telesalud. En educación, la telesalud nos ofrece la posibilidad de disminuir las brechas existentes entre la práctica profesional y la formación continua. Objetivo: Compartir una experiencia en educación para la formación de residentes mediante procesos innovadores de enseñanza impulsados por las nuevas tecnologías en la Argentina. Método: Hemos desarrollado un trabajo entre residencias médicas de todo el país a traves del uso de videoconferencia, con el objetivo de promover el razonamiento clínico como método de análisis de casos y favorecer la construcción colectiva del conocimiento. Resultados: Se realizaron un total de nueve encuentros por videoconferencia. Han participado 44 residencias y 200 residentes. El 33%, coincidió que "compartir y conocer formas de trabajar de otros residentes", fue lo que más los convocó. En primer lugar optaron por "continuar con razonamiento clínico y presentar casos como eje central de las discusiones". Han vinculado la experiencia con "un espacio para la discusión y reflexión y la posibilidad de crear redes de trabajo", por sobre otras formas tradicionales de aprendizaje. Discusión: La educación médica puede ser enriquecida por la incorporación de las nuevas tecnologías. Podemos involucrarnos en un aprendizaje transformacional, definido por un alejamiento de la memorización, e introducción del razonamiento clínico como método epistemológico; reemplazar la práctica aislada, por un trabajo en equipo e interconectado. Por último, alcanzar un aprendizaje a través de un conocimiento cooperativo y colaborativo a través de la videoconferencia. Conclusión: Explorar el potencial que la telesalud le ofrece a la educación de posgrado, permitirá crear nuevas propuestas innovadoras de formación para los profesionales de la salud.
Palabras-clave: *Educación Médica; Telemedicina; Telesalud; Videoconferencia; Razonamiento Clínico.*

Resumo

Proposta inovadora em educação: telessaúde, raciocínio clínico e construção coletiva do conhecimento.
Introdução: Como resultado das novas tecnologias aplicadas ao campo da saúde, surge uma disciplina que nos convida a rede-senhar a assistência, o ensino e a pesquisa: telessaúde. Na educação, a telessaúde oferece a possibilidade de reduzir as lacunas entre a prática profissional e a educação continuada. Objetivo: Compartilhar uma experiência em educação para a formação de residentes através de processos de ensino inovadores impulsionados por novas tecnologias na Argentina. Método: Nós desen-volvemos um trabalho entre residências médicas em todo o país através do uso de videoconferência, com o objetivo de promover o raciocínio clínico como um método de análise de casos e promover a construção coletiva do conhecimento. Resultados: No total, nove reuniões foram realizadas por videoconferência. Participaram 44 residências e 200 residentes. 33% concordaram que "compartilhar e conhecer formas de trabalhar com outros residentes" foi o que mais os convocou. Em primeiro lugar, optaram por "continuar com o raciocínio clínico e apresentar os casos como o eixo central das discussões". Eles associaram a experiência a "um espaço de discussão e reflexão e a possibilidade de criar redes de trabalho", sobre outras formas tradicionais de aprendi-zagem. Discussão: A educação médica pode ser enriquecida pela incorporação de novas tecnologias. Podemos nos engajar em um aprendizado transformacional, definido por um afastamento da memorização, e a introdução do raciocínio clínico como um método epistemológico; substituir a prática isolada, por um trabalho em equipe e interligado. Finalmente, alcançar a aprendizagem através do conhecimento cooperativo e colaborativo através de videoconferência. Conclusão: Explorar o potencial que a telessaúde oferece ao ensino de pós-graduação permitirá a criação de novas propostas inovadoras de formação para profissionais de saúde.
Palavras-chave: *Educação Médica; Telemedicina; Telessaúde; Videoconferência; Raciocínio Clínico.*

Introduction

In Argentina, the Residencia de Salud (Health Residen-cy) is a comprehensive postgraduate training system for re-cent graduates in the disciplines that make up the health team. The object is to complete their training exhaustively, exercising it in the responsible and effective performance of the corresponding discipline, under the modality of on-the-job training[1].

However, there is a marked shortage in the provision of health professionals worldwide[2]. As shown by the National Residence System, in Argentina huge inequalities persist in the number of residents and the quality of specialists be-tween provinces and municipalities[3].

So: What opportunities do the innovations that break into the 21st century in the formation of human resources in health and their distribution offer us?

As a result of the new technologies of information and communication applied to health, a discipline emerges that invites us to redesign the practice in an innovative way: tele-health or telemedicine.

Telemedicine or Telehealth[4-6] can be defined as the "pro-vision of health services by professionals, for whom distance is a critical factor, making use of Information and Communi-cation Technologies (ICT) in order to exchange information valid to make diagnoses, advocate or carry out treatment and prevention of diseases and accidents, for research and evaluation activities, as well as for the ongoing training of health care providers, to improve the quality of health of the individual and of the communities."

Telehealth in general and videoconferencing in particular are being widely used for distance medical education[7,8] and continuing education.

Video conferencing technology has allowed residents and other health professionals from different institutions to train in virtual environments of collaborative learning[9,10]. These technologies allow the creation of distributed class-rooms[9] where students and instructors dialogue with each other exchanging different experiences and perspectives on a topic.

The advantages of videoconferencing have been widely enumerated[11-14], among them we can mention the decrease in time and expenses to move in search of specialized train-ing, improve the efficiency of training programs to be able to replicate more frequently and allow sharing experiences with their own specificities on health issues linked to differ-ent epidemiologies. The videoconference is able to provide a broad postgraduate training offer in geographical areas lacking specialists[15]. At the same time, as a synchronous tool for distance communication, it allows designing educa-tional strategies, such as problem-based learning through clinical reasoning, to finally achieve innovative pedagogical objectives of the teaching-learning process.

A concept that must prevail is to focus the pedagogical objectives on the technological aspects.

In this regard, the ECHO[16] project (Extension for Com-munity Health Outcomes) is a model that has proven effec-tive in the care of complex patients through telehealth, in areas of shortage of specialists.

The objective of this article is to share an experience in education for the training of residents through innovative teaching processes mediated by new technologies in Ar-gentina.

Method

Descriptive, observational and transversal study. It was developed from the University Center for Research in Tele-medicine and e-health, Faculty of Medicine, University of Buenos Aires (http://www.fmv-uba.org.ar/telemedicina/). The project was called "Mediosphere Residents of Medical Clinic" (MR).

For the call, an explanatory program was developed with the objectives and the modality of participation. Residents of medical clinic, family medicine and general were invited, via mail. The residents participated from hospitals of high, medium and low complexity (Primary Health Care Centers), Faculties and Public Schools of Medicine and Ministries of Health of the provinces of Argentina.

During a year (2015-2016) nine monthly meetings of two hours duration were held, in evening hours.

The activity was developed in an optional way, the only restriction was to belong to a public institution and have videoconferencing equipment or software. The inclusion of residences could occur in any of the nine meetings held during a year.

For the development of the project, technology was used that allowed synchronous work, through equipment and videoconferencing software. The different institutions (nodes) had the necessary technology to facilitate the exchange of audio and video in real time. The connections of the videoconferences are made under H.323 protocol implemented with Voip visual communication, based on IP and SIP protocol. As offline support, the educational platform Edmodo ® was used, as a free software, which allowed to maintain a consultation forum and share bibliography asynchronously.
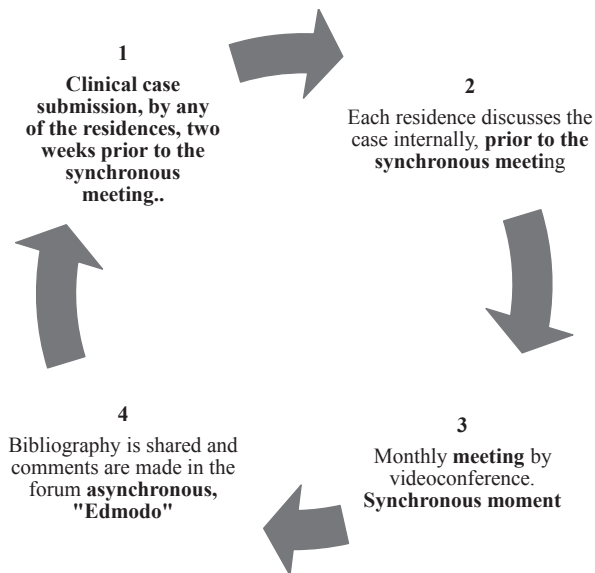
Pedagogical proposal

The activity pursued the following objectives:

1. Encourage learning based on your own cases.
2. Strengthen clinical reasoning as a method.
3. Promote a work within the participating institutions and integration between institutions and provinces of Argentina.
4. Include information and communication technologies in the generation of innovative environments for the teaching-learning process.

To achieve these objectives, an organization was proposed in stages (scheme 1), the whole of stage 3 is carried out by videoconference.

Esquema 1

1
Clinical case submission, by any of the residences, two weeks prior to the synchronous meeting..

2
Each residence discusses the case internally, **prior to the synchronous meeti**ng

4
Bibliography is shared and comments are made in the forum **asynchronous, "Edmodo"**

3
Monthly **meeting** by videoconference. **Synchronous moment**

Source: Own Elaboration.

1. Clinical case submission by one of the residences, ten days prior to the meeting.

2. Each residence receives the case and discusses it internally.

3.1. Presentation of the case by the residence that treated the patient, 7 minutes.

3.2. Discuss the residences, 40 minutes. It is moderated so that all residences participate.

3.3. One or two clinical experts present guidelines on clinical reasoning, 15 minutes.

3.4. Closure of the case, with final diagnosis. It is discussed by the residence that presented it, 20 minutes.

4. Between each meeting, a bibliography is shared and a new case is awaited by another residence.

In all the meetings the presentation of own cases was stimulated, these had to conclude with a diagnosis, that allow to reach it by means of the discussion from the interrogation and physical examination.

During the first four meetings, an educational strategy was emphasized to promote diagnosis through clinical reasoning as a method[17].

During this period it was possible to define the process by which the subsequent clinical cases were presented methodically. An expert clinician addressed the problems by stages (generation or evocation of one or more hypotheses, modification and refinement of the hypothesis, verification or refutation of its validity) [18].

At the end of the meeting, the residence that presented the case-problem, presented the definitive diagnosis reached, usually, through specific methods of laboratory or pathological anatomy.

During the period between videoconferences, the bibliography was shared and comments or reflections were presented in an asynchronous forum (Edmodo ®).

Data collection and analysis

In order to know demographic data of participation, the information coming from the IP of the videoconference equipment was used, as well as information provided by referents in each residence. In order to know the assessment of the residents around the educational modality, at the end of the project an anonymous survey was carried out using free software SurveyMonkey ® .

Ethical considerations

The survey was anonymous and the participants were aware of the purpose of the investigation.

Results

A total of nine meetings were held on a monthly basis from September 2015 to July 2016. During this period, a total of 44 different residences from all over the country participated, convened by the Faculty of Medicine, University of Buenos Aires. The meetings acquired federal character, with the participation of 15 of the 23 provinces that make up the
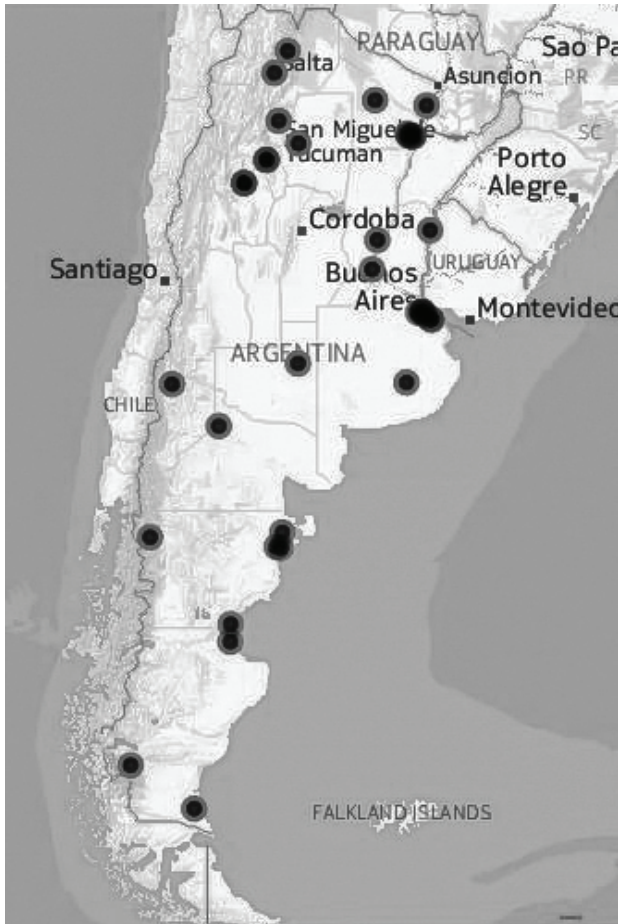
Argentine Republic, Photo 1.

The modality of videoconference has allowed them to participate in a synchronous and virtual way, residences with a maximum geographical distance between them, up to 3,500 kilometers (from Jujuy to Río Negro). Two hundred (200) residents of medical clinic, family medicine or general attended. The survey was answered by 39 residents, 19.5%.

Of the nine meetings, 44% (17 residents) participated in 6 meetings or more, and 46% (22 residents) in less than 6 encounters.

At the time of inquiring what called them to a greater extent, we found that 33% (13 residents), agreed to assess that "to know ways of working of other hospitals / residents", in second place 23% (9 residents) "the cases that

are discussed ", third place 20% (8) share a space between residents. In this question an open field was offered, "another" 20% (8), in which the same observation was expressed differently.

The priority of activities that would add to the Resident Mediosphere space was inquired:

The majority, 64% (21), gave the first place to clinical reasoning; Second, they would add research methodology and critical reading; third, bibliographical search; fourth, knowledge about technology and health, and lastly they would


Graphic 1
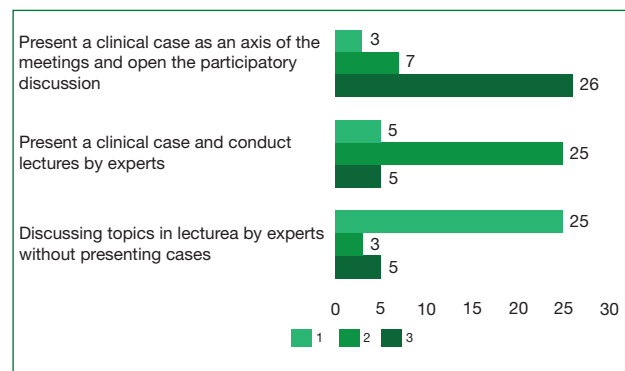
add updating of topics through exhibitors.

Slogan: Order according to your interest which method you prefer to develop in Resident Mediosphere meetings

As can be seen in Graphic 1, 76% (25 residents) choose, first, to present a clinical case as the axis of the meetings and to open the participatory discussion. At the opposite extreme, most agree that the least attractive modality would be to deal with topics in expository classes by experts without presenting cases (choice 3).

As a relevant fact, we can see Graphic 2: Residents link the affirmations "space for discussion and reflection" and "create work networks" to Mediósfera Residentes. As other studies show[19], residents have identified MR as an environment that allows them to increase theoretical knowledge, above the case (status) review activity and the medical shift.

Graphic 2
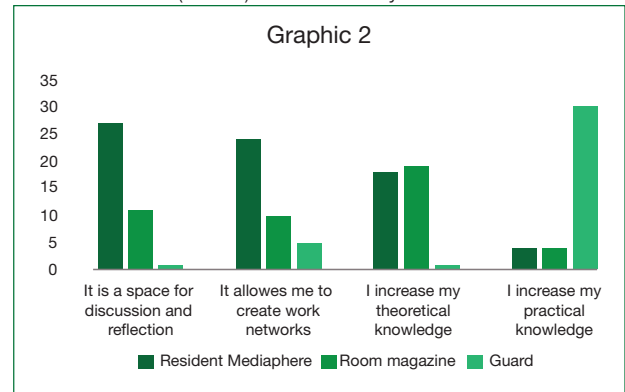
Slogan: Link the affirmations with the training spaces (Mediosphere, room magazine or guard).

Finally to improve the call, the majority, 51% (20 residents) considers as a priority to incorporate accreditation and certification for those who participate in the activity.

Discussion

Undoubtedly, medical education can be enriched by the incorporation of new technologies. A greater challenge is to create collaborative environments that renew traditional approaches in education. Telehealth asks us: how should we use new technologies to generate a transformation in learning?

The Lancet Commission[20] recommends us to engage in transformational learning. This is defined by three fundamental changes: a shift away from the memorization of information towards the search for answers based on specific problems. In our work, it is guided by "the discussion based on clinical cases". From there it is necessary to address the analysis, the ability to synthesize and clinical reasoning as a method to deal with problems in medicine. In our experience, the introduction of clinical reasoning as an epistemological method. The second change can be framed in the replacement of specialized and isolated work, by interconnected teamwork, facilitated by new information and communication technologies, in our case addressed through "networking by videoconferencing". Finally, and to achieve a transformational learning, the Commission urges the stimulation of creative approaches in medical education, through a collaborative knowledge, with participatory discussion originated from different perspectives of professionals trained with different theoretical frameworks, from dissimilar local realities.

As we have seen in the "voice" of the residents, they facilitate decisions regarding how institutions and teachers, we must face a change in the teaching and learning process. Addressing their perceptions may allow us to resignify learning, especially in a world in which subjective changes are faster than institutional changes.

However the more we move away from traditional models, as we gather in surveys, innovation through new technologies, must be formalized through certification and accreditation mechanisms, and even be part of the curriculum as has already been shown in other works[21].

Conclusion

The results stimulate the beginning of a path of instructive and institutional reforms, as proposed by the Lancet commission: we must "achieve a third generation reform", based on institutional and institutional changes, pursue problem-based approaches through reasoning and analysis of the situation and getting involved in an interdependent education, harmonized between networks and alliances, taking advantage of technologies as innovative resources for teaching.

In this sense, only this type of transformation will give significance to innovations in medical education and health services. The authors state that it is not a question of being dazzled by new technologies, but of introducing changes that provide opportunities in increasingly challenging contexts such as human resources for health[22] and medical residences.

We are aware that the health sciences in general and medical education in particular, face great opportunities that new technologies offer them. It will be the responsibility of the institutions linked to health to explore instructional and institutional changes that allow educating according to the new challenges in a context of health, education and increasingly complex technologies.

Acknowledgments

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