

Impact of SARS-COV-2 pandemic on medical education: "compulsory" migration for elearning modality, preliminary insights from medical education managers

Impacto da pandemia do SARS-COV-2 na educação médica: migração "compulsória" para o modelo remoto, uma visão preliminar de gestores da educação médica

Luiz Fernando Quintanilha¹ 

Katia de Miranda Avena² 

Lucélia Batista Neves Cunha Magalhães³ 

Bruno de Bezerril Andrade⁴ 

¹Centro Universitário UniFTC, Universidade Salvador (Salvador). Bahia, Brazil. contato@quintanilhaeducacao.com

^{2,3}Centro Universitário UniFTC (Salvador). Bahia, Brazil. katiaavena@hotmail.com, luceliagemagalhaes@terra.com.br

⁴Corresponding author. Centro Universitário UniFTC, Universidade Salvador, Escola Bahiana de Medicina e Saúde Pública, Fundação Oswaldo Cruz (Salvador). Bahia, Brazil. bbezerril.ssa@ftc.br

ABSTRACT | INTRODUCTION: The SARS-CoV-2 pandemic affected the educational models offered in medical courses. In this context, with the authorization to offer courses remotely, there is an unprecedented acceleration in the migration from the traditional model to the eLearning model, which was already occurring gradually in the Brazilian higher education system. Due to the social isolation to face the crisis, this model is being applied in full in many Higher-educational institutions (HEIs) in the country and may have repercussions on methodological changes in medical education. **OBJECTIVES:** To discuss the impact of the SARS-CoV-2 pandemic on medical education, analyzing the migration to eLearning Modality. **METHOD:** A reflection was made from management meetings at two private universities based on the authors' experience in medical education management. **RESULTS:** The global pandemic context has impacted teaching within the scope of students, professors, and HEIs. The high investments in the migration of the teaching model and the high dropout rate have impacted the suspension of contracts for teachers from private HEIs. The inequality of technological access, unsuitable environments, and the poor quality of telephony/internet in the country can impact on academic performance. **CONCLUSIONS:** It is undeniable that medical education is suffering a profound transformation by this global health crisis. However, it is too early to say with certainty the size of this impact. In the future, it will be necessary to adapt the concept of evidence-based medical education to assess the practical repercussions of this pandemic in medical education.

KEYWORDS: Coronavirus. eLearning. Medical Education.

RESUMO | INTRODUÇÃO: A pandemia por SARS-CoV-2 impactou os modelos educacionais ofertados nos cursos de Medicina. Nesse contexto, com a autorização para oferta de disciplinas remotamente, evidencia-se uma aceleração sem precedentes na migração do modelo presencial para ensino remoto, o que já vinha ocorrendo gradativamente no sistema de educação superior brasileiro. Devido ao isolamento social para enfrentamento da crise, este modelo está sendo aplicado integralmente em muitas Instituições de Ensino Superior (IES) do país, podendo repercutir em mudanças metodológicas na educação médica. **OBJETIVOS:** Discutir o impacto da pandemia do SARS-CoV-2 na educação médica, analisando a migração para o modelo remoto. **MÉTODO:** Baseado na experiência dos autores na gestão da educação médica, foi realizada uma reflexão a partir de reuniões gerenciais de duas IES privadas. **RESULTADOS:** O contexto de pandemia global promoveu impactos no ensino no âmbito do corpo discente, docente e IES. Os altos investimentos na migração do modelo de ensino e a alta taxa de evasão vêm repercutindo na suspensão de contratos de docentes de IES privadas. A desigualdade de acesso tecnológico, ambientes não propícios e a má qualidade da telefonia/internet no país podem impactar no desempenho acadêmico. **CONCLUSÕES:** É inegável que a educação médica está sendo profundamente transformada por essa crise global de saúde. Entretanto, ainda é cedo para afirmar com segurança o tamanho desse impacto. Futuramente, será necessário adaptar o conceito de Ensino Médico baseado em evidências para avaliar com clareza as repercussões práticas dessa pandemia no ensino da Medicina.

PALAVRAS-CHAVE: Coronavírus. Educação a Distância. Educação Médica.

Background of the situation

The global crisis caused by the SARS-CoV-2 pandemic has impacted societies around the world in several ways. Changes in the economy, professional, family, health, and education relationships have been intensively discussed. All these spheres have already suffered important impacts and will certainly continue to be impacted in the course of the crisis and for a considerable period after pandemic control.

Faced with the pandemic scenario, the Ministries of Education (MEC) and Health (MS) have been capitalizing on a series of measures whose impacts reflect directly or indirectly on the entire Brazilian society. For example, in the field of medical education, eLearning classes from the first to the fourth year in the undergraduate medical program, except for internship and laboratory professional practices, have been legally made possible for the time being. That generates significant changes in medical education and can greatly influence the *modus operandi* of medical courses and the actions of the main players involved in the very near future.

In the educational field, the scenario of adaptation to the crisis will no longer be an exclusively emergency and will impact the way medical education is managed in the country, including the adoption of remote teaching on a larger scale and its practical implications. In this context, from the perspective of managers of two private medical courses in the state of Bahia, this article proposes to discuss the impact of the SARS-CoV-2 pandemic on medical education, analyzing the "compulsory" migration to remote education, the strategies in the context of changes in the migration of teaching models, and the impacts on the *modus operandi* of medical schools in Brazil.

Abstract of the work

Based on the authors' experience in educational management in the medical area and considering the moment of a health crisis with profound impacts on the educational sector, a case report was made from organizational meetings of two private higher education institutions (HEIs) in the state of Bahia, carried out from March to June 2020. These meetings took place weekly and, in an extraordinary way, in

moments of urgent demands with the presence of members of the Structuring Teaching Nucleus and representatives of the maintainer.

From these meetings, the group of authors met for the development of the present work to discuss the impact of the SARS-CoV-2 pandemic in medical education, analyzing the "compulsory" migration to the remote model and its short and medium-term perspectives for managers, teachers, and students, the main actors in this process. In this context, the historical pre-pandemic and post-pandemic movements were highlighted, and from that, the construction of reflections about the impacts of these changes in the view of the authors.

However, due to the characteristics of the analysis, this work has a national scope for describing the current medical education scenario based on MEC and MS resolutions and performing prognostics based on current observations and evidence in the context of remote teaching in undergraduate medical courses.

Summary of results

General aspects of higher education in Brazil

According to the Higher Education Census published by the National Institute of Educational Studies and Research Anísio Teixeira (INEP) in 2019, the average age of teachers working in public and private higher education institutions (HEIs) is 38 years. This age group assumes that these teachers had contact with technological advances in an incipient way and were educated in traditional teaching models. On the other hand, students who enter higher education classrooms currently have an average age of 19 years (face-to-face education) and 21 years (eLearning).¹ Therefore, they belong to the so-called Z-generation, digital natives, globalized, used to interactive environments, and, due to these characteristics, have great difficulty in belonging to more traditional teaching models. At the same time, they are very receptive to new teaching and learning strategies.² Recent studies have shown that this generation is highly receptive to online tools and the insertion of active teaching methodologies and, therefore, extremely adaptable to the remote teaching model.^{3,4}

This observation is in accordance with data released by the Brazilian Association of Higher Education Maintainers (ABMES), which finds that, despite the pandemic, there has been a substantial increase in the number of students considering entering higher education early 2021.⁵ Besides, ABMES also projects that the number of enrollments in eLearning will exceed the number of enrollments in person before the predicted time and that hybrid education will continue with a strong trend of expansion.⁶

eLearning in Brazilian Higher Education

Although they are not synonyms and have characteristics that differentiate them, in this work, the terms "EaD" and "remote teaching" are used as such for their functional similarities in terms of the use of technology in the teaching-learning process. eLearning is understood as the educational modality in which didactic-pedagogical mediation in the teaching-learning processes occurs through technological "bridges" between the teacher and students who are geographically separated.⁷ Temporally, this modality can be synchronous or asynchronous, depending on whether the interaction occurs in real-time or not.⁸

The eLearning modality grows in alignment with changes in social contexts, such as access to the internet, the scarcity of free time, and other factors related to modernity. Also, because of the characteristics of the student, eLearning has gained strength in the country in recent years. From 2008 to 2018, the number of students enrolled in eLearning courses jumped from 463,093 to 1,373,321 students, an expressive increase of almost three times that allows us to predict that in the next few years, this modality will surpass the number of registrations in the face-to-face model.⁶

Specifically, in the undergraduate medical program, there are still restrictions, as will be demonstrated below. On the other hand, for continuing education, the eLearning courses' existence has always been considered beneficial and can reach professionals who live far from the large centers and/or with a shortage of time.^{9,10} Currently, there is a wide range of options for refresher courses in the country, covered by renowned teaching and research institutions offered in this modality.

Several advantages are reported in this teaching model, such as flexibility, universal access, cost reduction, and geographical reach. All these factors are considered positive characteristics of the eLearning model, making this teaching modality have positive perceptions and gain more and more adepts in Medicine and other health courses.¹¹ However, despite the substantial increase in courses, the eLearning modality in Brazil still lacks better preparation by teachers and tutors involved in the process^{12,13}, and some resistance is still identified on the part of teachers.^{14,15} That may be related to factors such as traditional training, resistance and fear of change, scarcity of resources, time for training, and inability with technological resources.¹⁵

eLearning Brazilian Regulation

The MEC has been clearly in favor of the expansion of eLearning in the country. The Brazilian decree 9,057/2017, for example, allows the HEIs to offer exclusively undergraduate and postgraduate lato-sensu courses at a distance without the need to offer face-to-face courses simultaneously. In 2018, eLearning courses also contemplated academic and professional postgraduate programs stricto-sensu (Master and Doctorate).

The expansion of eLearning vacancies universalizes access, allows students from the countryside to take their undergraduate and graduate courses, and, with this, increases the possibility of continuing education in more distant locations, in addition to facilitating the achievement of educational goals in the country in the area of higher education enrollment. Another indication in this direction came with a recent MEC resolution increasing the limit of subjects offered in the eLearning modality for undergraduate courses. The Brazilian ordinance 1,428/2018 doubled the limit, from 20% to 40%, for the offer of eLearning subjects in face-to-face courses. According to this ordinance, however, this rule does not apply to courses in the health area. It is not known how this scenario will evolve in the country nor the speed with which this will occur, but it is coherent to think, by evidence, that there will be a generalized increase of the offer of this teaching modality, besides the quality and efficiency of the technologies used by it. The migration to the remote model in the current SARS-CoV-2 crisis can contribute immensely to this scenario.

What lessons were learned

The impact of the pandemic on medical education

The new coronavirus pandemic (SARS-CoV-2) is imposing changes in relationships in the social, family, work, health, and education spheres. In this current scenario, the MEC has authorized eLearning for HEIs but has prohibited the medical course from doing the same. Shortly after, it changed its positioning and allowed the Medicine course to offer the online modality in the theoretical-cognitive disciplines from the first to the fourth year.

This way, the HEIs, especially the private ones, the majority in the country, could guarantee the fulfillment of the academic schedule and the entrance of resources from the tuition and enrollment. Data from the Union of Higher Education Institutions in the State of São Paulo (Semesp) pointed out that in August 2020, 99% of private HEIs had already migrated to remote education.¹⁶ In turn, despite the controversies generated, the students were guaranteed the right to finish the semester, in general, without delays. However, only the theoretical content of their subjects was contemplated. Although there are already alternative virtual tools¹⁷, it is forbidden to use them for subjects that contemplate practical activities in the pedagogical plan until the moment of the elaboration of this work.

When analyzing the impact on the teaching staff, it is observed that the teachers, mostly accustomed to the face-to-face teaching model, had to adapt quickly and compulsorily to this new format. Without time for the setting and training of the "new" technologies, it was clearly noticed a strong movement of the HEIs to train their teaching staff to virtualize activities promptly. The tools for this, in general, already existed but were not used or were underused. Thus, the remote model that was gradually gaining strength in numbers suddenly reached most of the private medical teaching offered in the country's main centers¹⁶, and teachers had to suddenly migrate all their class material to one or more online platforms. In this sense, institutions that had already made this migration suffered less impact since their academic community was already at least partially set up with the eLearning model.

On the other hand, there was a crueller impact on the teaching staff that revealed itself more visibly at the turn of the school semester. In addition to the already documented impact on quality of life^{18,19}, due to the possibility of maintaining remote classes regulated by the MEC, with the high investments in the migration of the teaching model and the high evasion rate in the eLearning modality^{20,21}, private HEIs suspended contracts. They carried out dismissals of many teachers throughout the country.

Public HEIs, on the other hand, paused their activities, and their teachers were prevented from teaching. Many arguments were used for the suspension, the most widespread being the inequality of technological access of their academic communities. Even in the medical course, usually with more affluent social characteristics, studies show a lack of Internet access at home and environments not conducive to better student performance.^{22,23} Add to this the known poor quality of telephony and internet in the country. In this scenario, some institutions have mitigated these inequalities with various strategies such as offering chips, lending notebooks to students with greater difficulties, and assigning spaces on their campus by appointment.

Future perspectives in medical schools

Just as the world's main centers have been practicing teaching through technological bridges, MEC has been encouraging the eLearning modality for some time. With the changes imposed by the pandemic, a good part of the teachers has become, necessarily, more used to the modality. In this context, future perspectives point to the increasing use of this modality by HEIs. That is the scenario that teachers and students must adapt to.

For HEIs, investing in remote and distance learning is advantageous because of the possibility of cost reduction and greater gains by staggering their regional presence. For students, despite the disadvantages mentioned above, it is more convenient, economical, and usual, as they are tools that are already part of this generation's daily routine. In this context, this model brings flexibility, economy, and respect to the student's learning time without being well organized and losing interactivity.

For teachers, despite the benefits of having their classes recorded and/or being able to teach from anywhere, the fact that it can be used exponentially brings a worrying consequence: the dispensability of the teacher's figure. It is not being stated here, in any way, that the teacher is not essential in the process, but that a single teacher may be responsible for the classes of a given curricular unit for a larger number of students/classes which, on-site, would be unfeasible. Therefore, this configuration may generate dismissals of other professionals involved in the same curricular unit, a phenomenon that is already clearly presented at this moment.

Despite the advantages already described, much is still discussed about the quality of remote and distance learning. As an example, the use of active methodologies, so debated and used today, lacks better adaptations and evidence of effectiveness in this model. eLearning evaluation is another obstacle that needs to be better discussed. On the other hand, although there is a need for deeper, broader, and better methodological studies on the subject²⁴, the literature brings evidence of equal effectiveness or even superior to face-to-face teaching as long as there is the use of methods that allow the achievement of the objectives of the discipline/course, student interaction and teacher feedback.²⁵ The quality barriers that may still exist will probably be solved very soon as the eLearning modality gains more followers, the competition increases, and the technologies evolve. In this sense, the universalization of this model in Brazil, problems of access (connection), and the inability of teachers and tutors with the technological tools used are unfavorable factors.

This change in the educational paradigm experienced, imposed, and accelerated by the current pandemic may mean substantial changes in the working relationship. Migration to the work model by contract or legal entity? Opportunities for teachers to develop new skills and tools with a financial return? It is not yet possible to say. However, it is past time for reflection on this topic.

Conclusions

It is possible that, except for the curricular units with the obvious need for practical content and, therefore, with indispensable face-to-face and laboratory activity, other disciplines can migrate to the remote model in a short period, with the constant quality increase due to the availability of new technological tools, the adaptation of HEIs and teacher training. As in other professions due to technological innovation, the time has come for teachers to undergo profound changes in their work configuration. Will it cause layoffs and a reduction of income? It is not possible to say. Can it open new perspectives? Nobody knows for sure. Will it impact the quality of the trainees? It is still too early to say because although it is expanding, there are still few studies in the area.

It is undeniable that medical education is being profoundly transformed from this global health crisis. However, it is still too early to affirm with certainty the size of this impact. In the future, it will be necessary to adapt the concept of evidence-based medical education to assess the practical repercussions of this pandemic on medical education.

Author contributions

All authors contributed to the conception, development, and writing of the scientific article, having approved the final version forwarded for publication.

Competing interests

No financial, legal, or political conflicts involving third parties (government, companies and private foundations, etc.) have been declared for any aspect of the submitted work (including, but not limited to grants and financing, participation in the advisory board, study design, preparation of the manuscript, statistical analysis, etc.).

References

1. Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (Brazil). Censo da Educação Superior 2018: notas estatísticas [Internet]. Brasília: Inep/MEC; 2019. Available from: http://download.inep.gov.br/educacao_superior/centso_superior/documentos/2019/centso_da_educacao_superior_2018-notas_estatisticas.pdf
2. McCrindle M. The ABC of XYZ: Understanding the Global Generations. 3a. ed. Bella Vista, NSW: McCrindle Research Pty Ltd; 2014. 288 p.
3. Quintanilha LF. University-Level pedagogical innovation mediated by Facebook and YouTube: a teaching-learning experience directed at the Z-generation. *Educ rev.* 2017;(65):249–63. <https://doi.org/10.1590/0104-4060.50027>
4. Quintanilha LF, Costa GN, Coutinho MR. Medical student perceptions about active methodologies in the study of physiology in medical schools in Salvador, Brazil. *Adv Physiol Educ.* 2018;42(4):693–6. <https://doi.org/10.1152/advan.00105.2018>
5. ABMES. Melhora a percepção dos jovens que pretendem começar uma faculdade em 2021 [Internet]. Brasília: Associação Brasileira de Mantenedoras do Ensino Superior; 2020. [cited 2020 Dec 25]. Available from: <https://abmes.org.br/noticias/detalhe/4097/melhora-a-percepcao-dos-jovens-que-pretendem-comecar-uma-faculdade-em-2021>
6. ABMES. Em 2022, curso on-line vai superar presencial [Internet]. Brasília: Associação Brasileira de Mantenedoras do Ensino Superior; 2020 [cited 2020 Dec 25]. Available from: <https://abmes.org.br/noticias/detalhe/3806>
7. Alves L. Distance learning: concepts and history in Brazil and in the world. *Rev Bras Aprend Aberta.* 2011;10. <https://doi.org/10.17143/rbaad.v10i0.235>
8. Silva FNMD, Meirelles FDS. The influence of synchronous interactive technology and the methodological adaptation on the elearning continuance intention [Internet]. *Rev Latinoam Tecnol Educ.* 2015;14(3):49–62. Available from: <http://hdl.handle.net/10438/23605>
9. Leite MTM, Carlini AL, Ramos MP, Sigulem D. Online continuing medical education: potential and challenges in the Brazilian context. *Rev Bras Educ Med.* 2010;34(1):141–9. <https://doi.org/10.1590/S0100-55022010000100017>
10. Oliveira AEF, Ferreira EB, Sousa RR, Castro Junior EF, Maia MFL. Distance Learning and Continuing Education: Searching for Progress in Health [Internet]. *Rev Bras Educ Med.* 2013;37(4):578–83. Available from: <https://www.scielo.br/pdf/rbem/v37n4/a14v37n4.pdf>
11. Faleiro FRG, Salvago BM. Distance Education in Undergraduate Dentistry Courses in Brazil. *Rev Bras Aprend Aberta.* 2018;17(1). <https://doi.org/10.17143/rbaad.v17i2.45>
12. Lau FA, Mendes VF, Ventura AA, Bollela VR, Teixeira LAS. Implantation of Distance Learning as Strategy in Medical Internship: Challenges and Perspectives. *Rev Bras Educ Med.* 2017;41(2):269–77. <https://doi.org/10.1590/1981-52712015v41n2rb20160069>
13. Pavanelo E, Krasilchik M, Germano JSE. Contributions to Teacher Preparation in Distance Education. *Rev Bras Aprend Aberta.* 2018;17(1):e072. <https://doi.org/10.17143/rbaad.v17i1.72>
14. Patto MHS. Distance learning and the demise of education. *Educ Pesqui* [Internet]. 2013;39(2):303–18. Available from: <https://www.scielo.br/pdf/ep/v39n2/a02v39n2.pdf>
15. Silva AVM. Technologies and Education: UNESCO's discourse. *Educ.* 2019;44:e65. <https://doi.org/10.5902/1984644437288>
16. Semesp. Pesquisa do SEMESP revela que 99% das IES privadas migraram para o ensino remoto. Nas públicas, apenas 41,8% [Internet]. Sindicato das Entidades Mantenedoras de Estabelecimentos de Ensino Superior no Estado de São Paulo [Internet]. São Paulo: Secretaria de Modalidades Especializadas de Educação; 2020. [cited 2020 Dec 25]. Available from: <https://www.semesp.org.br/imprensa/pesquisa-do-semesp-revela-que-99-das-instituicoes-privadas-migraram-para-o-ensino-remoto-nas-publicas-apenas-418/>
17. Silva JB, Bilessimo SMS, Scheffer GR, Silva IN. Remote Laboratories as an Alternative to Practical Activities in Distance Learning Courses. *EaD em Foco.* 2020;10(2):e810. <https://doi.org/10.18264/eadf.v10i2.942>
18. Oliveira GF, Alves MC, Costa CR, Silva AMS, Lofiego MCB, Oliveira VC, et al. Psychological user embracement during COVID-19: personal experience report. *Brazilian J Heal Rev.* 2020;3(4):10070–9. <https://doi.org/10.34119/bjhrv3n4-234>
19. Araujo RM, Amato CAH, Martins VF, Eliseo MA, Silveira IF. Title: COVID-19, Changes in Educational Practices and the Perception of Stress by Higher Education Teachers in Brazil [Internet]. 2020;28:864–91. Available from: <https://www.br-ie.org/pub/index.php/rbie/article/download/v28p864/6744>
20. Silva CMM, Rocha JV. New Technologies Applied in Distance Education: a Case Study on Retention and Dropout in Higher Educations. *EaD em Foco.* 2020;10(2):e919. <https://doi.org/10.18264/eadf.v10i2.919>
21. Kowalski A, Mattar J, Barbosa LC, Branco LSA. Student Dropout in Distance Education in Higher Education: Literature Review in Portuguese. *EaD em Foco.* 2020;10(2):e983. <https://doi.org/10.18264/eadf.v10i2.983>

22. Cardoso Filho FAB, Magalhães JF, Silva KML, Pereira ISSD. Medical student profile at Rio Grande do Norte State University (UERN), 2013. Rev. bras. educ. med. 2015;39(1):32-40. <https://doi.org/10.1590/1981-52712015v39n1e01092014>

23. Rego RM, Marques NA, Monteiro PC, Oliveira CLB, Lins NAA, Caldas CAM. The current profile of the Medicine student and its repercussion in the experience of the course. Para Res Med J. 2018;2(1-4):e05. <http://dx.doi.org/10.4322/prmj.2018.005>

24. Fernandes HL, Caron MF, Silva MAA. Presentation of the Dossier Education and Digital Media. Rev Eletrônica Educ. 2020;14(1-5):3902002. <https://doi.org/10.14244/198271993902>

25. Fontaine G, Cossette S, Maheu-Cadotte MA, Mailhot T, Deschênes MF, Mathieu-Dupuis G, et al. Efficacy of adaptive e-learning for health professionals and students: A systematic review and meta-analysis. BMJ Open. 2019;9(8):e025252. <https://doi.org/10.1136/bmjopen-2018-025252>