Quality Indicators in Pediatric Teaching in Times of Pandemic: A Narrative Review

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ABSTRACT

COVID-19 pandemic brought many challenges to education, and amongst them is the adaptation of a majorly practical graduation, the medical education, to a virtual configuration. Therefore, new strategies and tools must be thought to assure that quality will be maintained, and so here will be discussed a few quality indicators of teaching and learning in virtual medical education, with an emphasis on pediatrics. PubMed, Google Scholar, Brazilian Journal of Medical Education, Journal Portal of USP and Journal of Higher Education Assessment (Campinas) were searched, and there were used 7 inclusion/exclusion criterion to select 16 articles. Based on the selected articles, 8 quality indicators are highlighted and discussed below: ''interaction'', ''assessment distributed throughout the course'', ''motor skills acquisition'', ''combination of theory and practice'', ''internationalization'', ''territoriality'', ''communication skills acquisition'' and ''accessibility''. Due to the practical character of medicine teaching, there are not many articles that address specifically this issue. Hence, most of the articles presented here do not fit entirely to the virtual teaching of pediatrics, thus further research is needed on this matter. However, it was possible to synthesize the main quality indicators that could serve as a basis for future studies with regard to improving the quality of teaching in pediatrics.

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A Construção do Campo Epistemológico da Pedagogia Universitária no Brasil

RESUMO

A pandemia de COVID-19 trouxe diversos desafios para a educação. Entre eles, está a adaptação de um curso eminentemente prático, como a medicina, para o modelo virtual. Dessa maneira, novas estratégias e ferramentas devem ser pensadas para assegurar a qualidade de ensino. Portanto aqui serão discutidos alguns indicadores de qualidade no ensino remoto de disciplinas médicas clínicas, com destaque especial para a disciplina de pediatria. Foram buscados artigos no *PubMed*, no *Google Scholar*, na Revista Brasileira de Educação Médica, no Portal de Revistas da USP e na Revista da Avaliação da Educação Superior (Campinas), e, por meio de 7 critérios de inclusão e de exclusão, selecionados 16 trabalhos. A partir dos artigos selecionados, foram destacados e discutidos 8 indicadores de qualidade no ensino: ''interação'', ''avaliação distribuída ao longo da disciplina'', ''aquisição de habilidades motoras'', ''combinação entre teoria e prática'', ''internacionalização'', ''territorialidade'', ''aquisição de habilidades de comunicação'' e ''acessibilidade''. Devido ao caráter prático das disciplinas médicas, principalmente aquelas do ciclo clínico, como pediatria, poucos são os artigos que abordam, de forma mais específica, o tema em questão. Dessa forma, muitos trabalhos não se adaptam perfeitamente ao ensino de pediatria no contexto remoto emergencial. Assim, fazem-se necessárias maiores investigações acerca dessa questão. Entretanto, foi possível sintetizar os principais indicadores de qualidade que poderão servir de base para futuros estudos no tocante à melhoria da qualidade do Ensino em pediatria.

PALAVRAS-CHAVE

Indicadores de qualidade em educação. Formação médica. Educação virtual. Ensino superior.

Indicadores de Calidad en la Enseñanza Pediátrica en Tiempos de Pandemia: una Revisión Narrativa

RESUMEN

La pandemia de COVID-19 trajo varios desafíos a la educación. Entre ellos se encuentra la adaptación de un curso eminentemente práctico, como es el de Medicina, al modelo virtual. De esta forma, se deben idear nuevas estrategias y herramientas que aseguren la calidad de la enseñanza, y por ello, aquí se discutirán algunos indicadores de calidad en la enseñanza a distancia de las disciplinas médico-clínicas, con especial énfasis en la disciplina de la pediatría. Se realizaron búsquedas de artículos en *PubMed, Google Scholar,* Revista Brasileña de Educación Médica, Portal de Revistas de la USP y Revista de Evaluación de la Educación Superior (Campinas) y, a través de 7 criterios de inclusión y exclusión, 16 obras seleccionadas. De los artículos seleccionados, se destacaron y discutieron 8 indicadores de calidad de la enseñanza: "interacción", "evaluación distribuida sobre la disciplina", "adquisición de habilidades motoras", "combinación entre teoría y práctica ", "internacionalización", "territorialidad", "adquisición de habilidades comunicativas" y "accesibilidad". Debido al carácter práctico de las disciplinas médicas, especialmente las del ciclo clínico, como la pediatría, existen pocos artículos que aborden, de manera más específica, el tema en cuestión. Así, muchos estudios no se adaptan perfectamente a la enseñanza de la pediatría en el contexto de emergencias remotas y, por tanto, es necesaria una mayor investigación sobre este tema. Sin embargo, fue posible sintetizar los principales indicadores de calidad que podrían servir de base para futuros estudios en cuanto a mejorar la calidad de la docencia en pediatría.

PALABRAS CLAVE

Indicadores educativos. Formación médica. Aprendizaje virtual. Enseñanza superior.

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Introduction

The year 2020, marked by the COVID-19 pandemic and, therefore, by social isolation, brought challenges to all sectors of society. In this context, education had to reinvent itself and, in a short period of time, remote learning became a plausible and indispensable solution for the continuity of the school year. Thus, to adapt to this new reality, many universities have adopted Emergency Remote Learning (ERL), as was the case at the Universidade Federal de Minas Gerais (UFMG).

However, remote teaching (RT) still suffers a lot of resistance from various educational sectors, especially in the health area, which can hinder the adherence and commitment of teachers to this new scenario. One of the reasons for this is that many see an insurmountably of mostly practical courses for the virtual environment, in addition to an incompatibility between the needs of the Unified Health System (SUS) - the integral, intersectoral, and multiprofessional care of the user - and remote teaching. This perception thus does not allow the visualization and exploitation of new opportunities that arise at this time, since RT, in contrast to face-to-face teaching, can, through new teaching tools and student-teacher interaction, overcome the medical-centered and biological model taught in medical schools (VIEIRA, TEO, 2018). But for this to happen, remote teaching cannot be a simple transposition of the face-to-face model to the virtual format. In this sense, new methodologies, and tools must be explored.

Moreover, it is of utmost importance, for the understanding of the issue to be addressed in this paper, to differentiate the concepts of virtual teaching, ERL and distance education (DE). In this work, we consider virtual teaching as education in a virtual teaching-learning environment (VTLE), which includes several educational resources, made available in software (RODRIGUES *et al*., 2009). On the other hand, DE is a synchronous or asynchronous teaching, in which students and teachers are in separate environments and that may or may not use a VLE (JOYE, MOREIRA E ROCHA, 2020). This modality was conceptualized in the Decree Law No. 9.057/2017, which states:

> Art. 1 For the purposes of this Decree, distance education is considered the educational modality in which the didactic and pedagogical mediation in the teaching and learning processes occurs with the use of information and communication means and technologies, with qualified personnel, with access policies, with compatible monitoring and evaluation, among others, and develops educational activities by students and education professionals who are in different places and at different times. (BRASIL, 2017)

Finally, the ERL is not, like DE, a new educational model, but a temporary solution for emergency moments, in which the activities, previously entirely face-to-face, are now done remotely, to reduce the damage arising from the impossibility of physical meetings. In this sense, similarly to DE, digital technologies are used, but the DE does not presuppose the qualification of the professionals involved in the teaching-learning process, an adequate technological structure, or guaranteed student access to the teaching platforms. Moreover, one

can highlight that, in DE, there is the involvement, in teaching, of a multi-professional team, while in this emergency model, many times, the teacher is the only responsible for the production and execution of all digital material used in the teaching process (JOYE, MOREIRA E ROCHA, 2020).

In this context, ensuring the quality of education and the feasibility of transposing practical activities to the virtual environment are some of the new challenges that emerge in health graduations, especially in the medical course. Thus, it is crucial and urgent to discuss these points. Therefore, the aim of this narrative review is to synthesize, by means of a critical analysis, the main indicators of quality of learning in clinical medical disciplines, specifically in ERL, with a focus on Pediatrics.

Method

The PubMed database search tool was used, which gathers the most up-to-date and evidence-based knowledge in the biomedical area, as well as Google Scholar, which has many pertinent works in the Portuguese language and within the Brazilian context. Articles were also searched in the Brazilian Journal of Medical Education, in the Portal of Journals of the University of São Paulo, and in the Journal of Higher Education Evaluation (Campinas), to gather articles about the Brazilian reality, which is the focus of this review. As this is a new theme that emerged in an emergent moment, therefore little addressed in the literature, the search and the selection of papers were challenging and, thus, these journals and platforms were chosen, since they had articles that fit this theme. Finally, we used some articles present in the bibliographic references of the researched articles and works that cited the researched articles, those that were deemed essential for the discussion of the topic of interest, as well as some guidelines from the Ministry of Education on education, on EaD and on remote teaching.

The search terms used in PubMed were "quality indicators that assess student learning in pediatrics," "quality indicators that assess student learning in medical school," and "quality indicators that assess student learning in distance medical school," and initially 41 articles were selected, all published between 2015-2020, in order to gather the most updated data on the subject. In Google Scholar, the term "Quality indicators that assess student learning in Pediatrics" was searched, and three initial articles were selected. For the *Revista Brasileira de Educação Médica, Portal de Revistas da USP, and Revista da Avaliação da Educação Superior* (Campinas), the terms "Distance Education," "Virtual Teaching," and "Remote Teaching" were used, and five initial articles from the first, one article from the second, and two articles from the last were selected. It is worth pointing out that, as already elucidated, these three terms have different concepts and, therefore, cannot be used as synonyms. However, because they have common characteristics, and due to the new and little explored character of DE in the literature, unlike DE, papers that addressed any of these terms were included in this analysis to enrich it, considering, however, the due limitations inherent to the comparison between DE and DE.

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To select the studies, the following inclusion criteria were used: a) evaluate indicators of quality in learning; AND/OR b) address virtual teaching, RE or DE; AND/OR c) address learning indicators in medical courses or in the health field in general; AND d) be written in English or Portuguese; AND e) be open access. The exclusion criteria were as follows: a) articles about the basic cycles or about mandatory internships in undergraduate medicine, which would go beyond the objectives of this study; AND/OR b) literature reviews.

Based on these inclusion and exclusion criteria, 19 references were selected for the construction of the present study.

Results and Discussion

Of the references used, 5 were related to the indicator of quality of education "interaction", the indicator that was most addressed in the literature analyzed, and that, therefore, has a greater emphasis in this article. In the item "Motor Skills Acquisition", 4 works are cited, in "Territoriality" and in "Accessibility", 2 articles are explored each, and the other items are highlighted, each one, by a different study.

It is important to emphasize that this is a theme not often addressed in the literature, since the medical course is eminently practical and face-to-face, which hinders the search for studies that specifically address indicators of quality of remote teaching of clinical subjects in the medical course. Therefore, the articles cited here have not necessarily analyzed specific aspects of the medical field or its emergency remote teaching. Instead, some address distance education, with all its particularities. Thus, many analyses made go beyond the objective of the original works. Nevertheless, the current scenario has created urgent and global challenges for the teaching of medical disciplines, which makes the discussion of this theme extremely important. Thus, the main quality indicators found in the literature will be addressed below.

Quality Indicators

The concept of quality can be subjective, not being, as it may seem at first, a universal concept, which contains only one meaning, but "a property that is found in beings, actions or objects" (MOROSINI *et al*., 2016). Thus, the definition of "teaching quality" depends on the values and standards assumed by the subject at the time of his or her speech. Bertolin (2007) highlights three distinct and common views about "quality": "economicism view (economic competitiveness and market growth), pluralist view (sustainable socio-cultural and economic development), and equity view (social cohesion and equity)" (BERTOLIN, 2007).

Thus, given the different meanings of the term, it will be considered here, the quality of education as one that promotes the personal development of the student, generating "power of cultural creation, critical spirit and reflective thinking" (MOROSINI, 2016), on which is based the Law of Directives and Bases of National Education (BRASIL, 1996), which relates more to the pluralistic view of quality (BERTOLIN, 2007). Nevertheless, throughout the

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discussion on indicators of quality education, accessibility will also be considered, since this is still a relevant issue in the context of Brazilian universities, which have students from different socioeconomic groups. In this way, an equity view of the term "teaching quality" will also be explored (BERTOLIN, 2007).

Therefore, considering a synthesis of the analysis carried out in this narrative review, some indicators based on these premises will be highlighted, with the challenge of pointing ways to develop a quality remote education.

Interaction

Nunes (2018) points out the interaction between student, teachers, and tutors, in distance education, as an important indicator of quality of the teaching-learning process. This interaction should generate the construction of knowledge, while there is communication, in spaces that allow this exchange of knowledge, and not the simple reaction of the student to what was passed. This proposal dialogues with the National Curricular Guidelines, which advocate an active education centered on the student, who should be the "subject of learning", being the teacher the "facilitator and mediator of this teaching-learning process" (BRASIL, 2006). Moreover, the sharing of decisions between students and teachers in the teaching environment, through the construction of a relationship based on dialogue, affection, respect, and trust, called "pedagogical democracy," is one of the indicators of quality of education in pedagogical innovation (MOROSINI *et al.*, 2016).

When this does not happen, there may be isolation of the student, which is one of the main causes of dropping out of undergraduate studies (NUNES, 2018).

Moreover, the same study conducted by Nunes (2018), through a questionnaire applied to teachers (n=7), tutors (n=9) and students (n=20) of the EaD Biology course at the Federal University of Tocantins (UFT), assessed the perception of participants regarding the interaction occurring through the virtual space. The main ways in which it happened, according to the students, would be via e-mail and via forum, through the moodle platform, means of communication very commonly used in several universities in Brazil. However, many e-mails took a long time to be answered, or were not answered at all, and the forum, according to the research, recorded the opinions "in a linear, limited and static way among the participants", generating little "exchange of ideas" and a "reactive interaction".

Another common medium addressed in the study, but less used than the first ones, would be videoconferencing. This platform, although it allows, through mutual viewing among participants, a more complete interaction than the other communication channels, requires a lot of internet data, which generated difficulties for constant use by many UFT students (NUNES, 2018).

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Additionally, to this, peer interaction is especially relevant in healthcare, as the construction of clinical reasoning depends on teamwork, both among physicians and among healthcare professionals from different backgrounds. A study by Fürstenberg *et al*. (2019) assessed the predictor variables of clinical reasoning ability among 62 medical students by simulating their first day in residency. In it, teamwork, defined by the exchange and distribution of information, together with medical knowledge, were pointed out as predictors of quality in the construction of clinical reasoning (p=0.015 for the correlation between teamwork and clinical reasoning). This skill is essential for the formation of the medical professional, since it is the pathway to reach a diagnosis and to make decisions, and integrates information obtained through the patient's history, physical examination, and any complementary exams (FÜRSTENBERG *et al*., 2019). Thus, as clinical reasoning is developed throughout the course, including in pediatric disciplines, one sees the importance of interactive learning that includes working together. Therefore, in the context of remote medical education, despite the impossibility of face-to-face meetings between colleagues and of conducting bedside teaching, virtual discussions of clinical cases in small groups, as well as other team activities, can be interesting alternatives.

Finally, the importance of interaction also stands out in the moments of student assessment, being essential, in remote teaching, the constant monitoring of the student (BRASIL, 2007). In this way, gaps in learning are identified throughout the teaching process, learning is done actively, and assessment starts to contribute to the teaching process. This aspect can be especially challenging in medical classes with many students, as is the case of UFMG's classes, which each have 160 students. However, in clinical disciplines such as Pediatrics, in which classes are divided into groups of up to 10 students, the accompaniment in the evaluation of the students by the professors becomes more plausible.

All these challenges, such as the impossibility of face-to-face meetings between students and with real patients, the slow and linear interaction, and the difficulty in accessing the network, make it difficult to guarantee this quality indicator. Thus, they can, by limiting the interaction, harm the quality of teaching, since they would undermine the active and student-centered teaching-learning process foreseen in the National Curriculum Guidelines (BRASIL, 2006), replaced by an expository and vertical teaching. In this context, it can be inferred that the "critical spirit" and "reflective thinking" generated by a quality education (MOROSINI, 2016) may not be stimulated.

Still, it is worth noting that, although some studies cited above address DE, which generates inherent limitations to the differences between this model and RES, it is seen that these problems are also present in remote education.

Assessment Distributed Throughout the Discipline

In a research conducted by Galvão and Magalhães (2009), the use of an online and asynchronous exercise system was evaluated in the subject Legal Medicine and Medical Deontology at the University of Brasília (UnB), in a class of 38 students. Although most of the students accessed the platform (84%), more than half of the activities (52%) were done 24 hours before the exam, and 72.5% in the last 48 hours. This "last minute" study pattern favors short-term memorization over long-term, and thus the content is quickly forgotten, not contributing to the professional development of students. Thus, the study concludes that, for an effective learning, the exercises could be available in stages and have their realization encouraged throughout the period (GALVÃO AND MAGALHÃES, 2009).

Thus, as in the RT most of the activities are asynchronous, so that students have greater freedom to do the activities at the time they want, and universities have less control over the attendance of students, this issue becomes even more relevant. Although the study specifically assessed students from UnB, now, this practice may have become recurrent among students from all over the country, and, therefore, further investigations on the subject are necessary. Even so, it can be indicated that activities with shorter deadlines for delivery, as well as a greater number of assessments throughout the courses, may be possible solutions to this problem.

Motor Skills Acquisition

The practical disciplines of the clinical cycles of medicine require graduates to perform a complete and correctly performed physical examination. This is especially important, for example, for the discipline of Pediatrics I in the medical course at UFMG. This is because one of the main goals of the discipline is to train students who can collect vital data, anthropometric measurements, clinical signs of the COONG (Head, eyes, ears, nose, and throat) and neck of patients, as described in the orientation program for pediatrics 1 students at UFMG (UFMG, 2020). This competency can be challenging for the ERL context, as physical contact with patients at this time is inhibited. However, virtual reality tools can meet, at least in part, this demand (VIEIRA AND TEO, 2018).

A research done by Barilli, Ebecken and Cunha (2011), from the Laboratory of Computational Methods in Engineering of the Federal University of Rio de Janeiro, together with the National School of Public Health Sérgio Arouca of the Oswaldo Cruz Foundation, generated the creation of a course for health professionals, agents, and teachers. The program used virtual reality to simulate the measurement of anthropometric measurements (weighing and measuring), with people participating in person (n=16) and remotely (n=82). Participants included professionals in educational technology, software technology, the target subject of system content, and design; faculty; and professionals in the public health field. Among the health professionals were students of the ENSP/Fiocruz distance learning course on Food and Nutrition Surveillance.

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The tool was a three-dimensional simulation, available on the internet in a virtual environment, which could be accessed from the student's computer. It allowed the visualization and manipulation of 3D objects, the simulation of weighing and measuring procedures, and the execution of exercises, among other features. This research obtained incredibly positive feedback from students: all participants considered the exercises to be adequate and declared that they had had a pleasurable experience, and most of those who participated said that the experience "collaborated with their learning process" (BARILLI, EBECKEN, and CUNHA, 2011).

Thus, we see that virtual reality tools can add to educational practices and can be an interesting solution for the present moment. Besides generating a physical-motor learning, they can also provide the student's follow-up and an active learning. Because the program can be accessed via the Internet, its implementation cost is not so high, compared to tools that use simulation rooms, helmets, and gloves, for example.

It is important to counter that, although the availability of material resources is an indicator of quality in medical education, it is necessary to evaluate the concrete benefits brought by new technologies in academic performance and student learning (GIESLER *et al*., 2017). Moreover, it is relevant to consider that the research included health professionals and agents, teachers, and students of an EaD course, with a quite different profile from undergraduate medical students. Thus, the return obtained in this work could be different in the remote teaching of undergraduate medical education and of the pediatric disciplines. Also, it is worth noting that many resources, as presented above, require the possession of a computer and a good quality network, which is not the reality of many students in Brazilian universities, including students from UFMG, which may hinder the acquisition of this quality indicator.

Combining Theory and Practice

Besides the acquisition of motor skills, as mentioned above, practice, in the medical course, has a protagonist role to consolidate content learned in theory. Thus, among other aspects, it is essential to form students who know how to establish a good doctor-patient relationship, who work well in a team, who dominate clinical reasoning, and who know how to conduct a good anamnesis and a good physical exam.

An observational survey of medical graduates of the Freiburg Medical School (N=490) assessed, by means of a questionnaire, the relationship between several predictor variables (related to the organization, structure, and teaching of the course), and outcome variables (such as scores on residency exams, self-assessment of medical expertise, scientific skills, and satisfaction). As a result, a significant relationship was observed between the combination of theory-practice and medical expertise/satisfaction (BILLER, BOEKER, FABRY AND GIESLER, 2015).

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Therefore, due to the great importance of practice in the formation of the medical profession, the current pandemic moment brings, with it, a great challenge, given the current impossibility of encounters between students and patients. Proposals such as anamnesis simulations between colleagues or between students and teachers, through video calls, or even consultations with people who live in the same environment as the student are interesting, can serve as a temporary solution to this problem, and are suitable for the teaching of pediatrics. However, personal contact with real patients, in non-staged situations, brings an irreplaceable richness to learning. Thus, we see that the impossibility of practice generates inevitable losses for the medical course.

Internationalization

According to Morosini *et al*. (2016), the direct relationship between quality of education and internationalization is not yet clear. However, it is known that this phenomenon generates a sharing of knowledge and resources, which can be an interesting tool at this time, when the entire planet is going through the same challenge: to transpose higher education to the virtual model. Although face-to-face exchanges are now unfeasible, new opportunities open, such as virtual participation in international seminars, the sharing and joint creation of digital tools that assist in the learning of medical disciplines, and the exchange of platforms for accessing articles or scientific journals.

More than ever, with the advent of the pandemic of COVID-19 and the increasing spread of fake news, the role of the health professional in educating the population through evidence-based information has become crucial. Moreover, international cooperation in the development of vaccines, drugs, diagnostic methods, and knowledge about the disease has proven indispensable, and universities have been protagonists of this phenomenon.

Territoriality

The student's involvement with the community around them, forming networks that problematize relevant issues, is also an important aspect to ensure the quality of learning (FAGUNDES, MUNIZ, & GHISLENI, 2018). This presupposes that knowledge is also built outside the university space, in everyday life, to prepare the student for "real life" and to generate a return from the university to society (MOROSINI *et al*., 2016). This can be achieved by the participation of undergraduate students in extension projects and scientific initiation, which, besides associating theoretical and practical content, often generate relevant local impacts. It is also important to highlight the fundamental role of university hospitals, which, besides contributing to the education of students, are prominent in the public care of the Brazilian population and in the generation of academic knowledge.

However, achieving this indicator becomes a challenging task in the context of pandemic and RHE. This is because, currently, there is a great difficulty in carrying out extension projects and in-person research, besides the impossibility of care, by students, in university hospitals. In this sense, creativity and innovation are essential to generate tools and

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projects that, remotely, can integrate the student to the community and, at the same time, generate a relevant return to society. As positive experiences, we can cite extension projects carried out by the UFMG School of Medicine, which consist in the creation of communication channels available to the population, through the "WhatsApp" network and call center, in which previously trained students answer questions about COVID-19. Another example are the various initiatives of faculty members who, together with students, have created evidence-based digital content for the dissemination of scientific knowledge in social media.

Acquisition of Communication Skills

Communication skills are recognized as important in medical education, since they are essential to conduct a quality consultation, to build a doctor-patient relationship, and to ensure treatment adherence, among several other attributes. Thus, their teaching should be a priority in medical schools. Despite this, it is noticeable that, in general, throughout the course, students tend to lose these skills, and their teaching, especially in the clinical cycle of the course, is often developed informally and implicitly, with no targeted training on these techniques (JUNOD PERRON *et al*., 2018).

In a study by Junod Perron *et al*. (2018), between 305 and 389 students and 16 professors or coordinators from 5 Swiss medical schools answered a questionnaire, with 33 items, about the perception about teaching and preparation in communication skills. Among these items, some with less approach throughout the course stand out: communicating with patients at the point of death, with patients with language difficulties, or with vulnerable patients; making shared decisions; dealing with dissatisfied patients or families; communicating with professionals from different backgrounds; and talking with patients over the phone (JUNOD PERRON *et al*., 2018).

Thus despite the relevance of teaching communication in the medical course, its approach is often insufficient. It is worth pointing out that, because this is a research in a reality quite different from the Brazilian one, it is necessary to further explore this theme in national universities to understand how the teaching of communication skills is done in medical schools throughout the country. Still, one can highlight the importance of this topic, which should be taught more explicitly. Thus, in the context of remote teaching, it can be covered virtually by means of lectures, discussion of videos in small groups, or simulations among colleagues. Finally, at this point, telemedicine can also be an alternative for training communication with real patients, always supervised by teachers.

Accessibility

Morosini *et al*. (2016) also points to the "conditions of support and permanence of students" as a key element in ensuring quality undergraduate education. This is especially relevant for the ERL, since the virtual model requires substantial material conditions. Moreover, AVEA software is often not very accessible for people with disabilities (PcDs) and

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the student body is often heterogeneous, composed of people from different social classes and with different demands, which can compromise access to education.

In addition, the current moment has generated high unemployment rates, which, besides increasing the social vulnerability of many students, may cause many to be forced to contribute financially (or to contribute more) in their homes. This can then lead to a decrease in the academic performance of these students. A cross-sectional study done by Niquini *et al*. (2015) with working college students (n=211), who studied in the night shift at a public university in the State of São Paulo, showed a positive correlation between worse academic performance and longer daily hours (p-value<0.05), and worse academic performance and higher demand at work (p-value<0.01).

Therefore, there is no way to discuss the quality of remote education without first ensuring the basic conditions so that students can access it. Thus, institutional policies that ensure access to virtual media and that generate material conditions (such as food and housing), to prevent lower performance or even student dropout, are of utmost importance. It is also worth mentioning the guarantee of virtual tools accessible to PcDs and of special conditions for people who, at this moment, must take care of children, family members or sick people, or who have taken on more domestic responsibilities.

Finally, considering the analysis performed in this review, the synthesis of the main quality indicators, as well as their characteristics, the difficulties for their implementation and the possible solutions to these challenges, in the context of RRE, are described in Table 1.

Table 1. Main Indicators

	Main Features	**Implementation Difficulties**	**Possible Solutions**	**Main References**
Interaction	The interaction, by means of the joint construction of knowledge, the sharing of decisions, team work, and monitoring throughout evaluations, guarantees a higher quality of teaching and lower dropout rates;	Impossibility of face-to-face meetings between students, between student-teacher and with real patients; interaction often linear, limited or slow. Difficulties in accessing quality internet;	Virtual discussions of clinical cases in small groups. Further subdivision of large classes into small groups;	NUNES, 2018; BRASIL, 2006; MOROSINI *et al*., 2016; FÜRSTENBERG *et al*., 2019; BRASIL, 2007.
Assessment Distributed Throughout the Discipline	The assessment distributed throughout the course contributes to continuous study, generating the consolidation of learning throughout the course. Thus, it generates knowledge	Greater flexibility of remote learning, which allows asynchronous activities to be performed at varied times, and less control of attendance by educational institutions;	More evaluations throughout the courses, with shorter deadlines;	GALVÃO E MAGALHÃES, 2009.

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	that will be used in the students' future professional practice;			
Motor Skills Acquisition	The acquisition of motor skills is fundamental to learning important items in medical training, such as the physical examination;	Current impossibility of contact with patients; Difficulties in accessing the internet network or digital equipment;	Use of virtual reality tools, via the Internet network;	UFMG, 2020; VIEIRA E TEO, 2018; BARILLI, EBECKEN E CUNHA, 2011; GIESLER *et al.*, 2017.
Combining Theory and Practice	The theory-practice relationship is essential for learning clinical reasoning, the doctor-patient relationship, the anamnesis, and the physical examination;	Impossibility of face-to-face meetings between students and with real patients;	Simulations of anamnesis between colleagues or between students and teachers, by video calls; Consultations with people who live in the same environment as the student;	BILLER, BOEKER, FABRY e GIESLER, 2015.
Internationalization	Internationalization generates exchange of knowledge and resources between universities around the globe, which becomes interesting in this time of global crisis;	Impossibility of face-to-face exchanges between universities in different countries;	Virtual participation in international seminars; Sharing and joint creation of digital tools that aid in the learning of medical disciplines; Exchange of platforms to access articles or scientific journals; Partnerships in research;	MOROSINI *et al.*, 2016.
Territoriality	Territoriality is a set of actions that integrate the student to the community, providing greater learning for the students and benefits for the whole society;	Difficulty in carrying out extension projects and in-person research; impossibility of medical care, by the students, in the university hospitals;	Creation of communication channels with the community; virtual sharing of scientific knowledge;	FAGUNDES, MUNIZ E GHISLENI, 2018; MOROSINI *et al.*, 2016.
Acquisition of Communication Skills	Communication skills are fundamental to the proper conduct of the consultation and to building the doctor-patient relationship;	Insufficient approach and training in medical courses.	Virtual lectures or simulations;	JUNOD PERRON *et al.*, 2018.
Accessibility	Accessibility is the	Lack of access for	Actions that	MOROSINI

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socioeconomic conditions that not only generate better academic performance, but also allow the student to remain in higher education.	many students to the internet or technological tools, lack of accessibility of digital platforms for PcDs, increased social vulnerability of many students at the present time.	guarantee housing, food, technological tools, and internet network for vulnerable students; Adaptations for PcDs. Special conditions for students who have started working, or taking care of family members.	*et al.*, 2016. NIQUINI *et al.*, 2015.

Source: Prepared by the Authors.

In view of what is shown in Chart 1, it is evident that there are solutions that can make the implementation of quality indicators feasible in the context of ERL, thus allowing an improvement in the quality of education.

Conclusion

Many are the opportunities brought by the MRE, which can generate improvements in teaching in medical schools, including on a permanent basis. However, it is worth noting that many studies brought here refer to continuing education, not to graduation itself, or to distance education (not the emergency model). Thus, due to the difference in the profile, expectations, and goals of EaD or continuing education students compared to students in the face-to-face model (who experience remote learning temporarily), the articles covered here may present results that do not fully fit the current context. Moreover, few articles refer to remote learning specifically in the medical course, which can be explained by the fact that this modality, in the medical field, started to be thought of in many universities only at this time of the pandemic. Thus, it is important to point out the difficulty encountered in selecting articles for the present work that more specifically approached the theme of interest. Finally, it is also important to highlight that the works mentioned here do not cover all the available literature on the subject, nor do they exhaust the indicators of teaching quality that could be addressed.

Despite the difficulties inherent in this narrative review, due to the factors previously mentioned, it was possible to synthesize the main indicators of quality, which may serve as a basis for future studies on improving the quality of pediatric education.

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