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Analysis of an evaluation method in Morphofunctional Sciences for medical training during the COVID-19 pandemic

Análise de um método de avaliação em Ciências Morfofuncionais para formação médica durante a pandemia de COVID-19

Análisis de un método de evaluación en Ciencias Morfofuncionales para la formación médica durante la pandemia de COVID-19

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Paola de Lima
ORCID: https://orcid.org/0000-0001-7647-266X
Federal University of Ceará, Brazil
University Center for the Development of Alto Vale do Itajaí, Brazil
E-mail: paola.lima@unidavi.edu.br
Renata Souza e Silva
ORCID: https://orcid.org/0000-0002-7495-9455
Federal University of Ceará, Brazil
E-mail: renatasosi94@gmail.com
Denis Guilherme Guedert
ORCID: https://orcid.org/0000-0002-7952-8355
Federal University of Ceará, Brazil
University Center of Brusque,Brazil.
E-mail: denisguedert@gmail.com
Virgínia Cláudia Carneiro Girão-Carmona
ORCID: https://orcid.org/0000-0002-0676-8585
Federal University of Ceará, Brazil
E-mail: virginiaccg@gmail.com
Delane Viana Gondim
ORCID: https://orcid.org/0000-0002-7240-3314
Federal University of Ceará, Brazil
E-mail: delanegondim@yahoo.com.br
Mariana Lima Vale
ORCID: https://orcid.org/0000-0003-2120-411X
Federal University of Ceará, Brazil
E-mail: marianavale@ufc.br

Abstract
The pandemic caused by COVID-19 brought great challenges to higher education institutions, both teachers and students had to quickly adapt to remote classes. Methodologies were developed to improve the interaction of professors with their students, but evaluation processes carried out remotely were often difficult and not very effective. This research sought to assess the perception of medical students about an innovative evaluative experience carried out during the pandemic period. The assessment consisted of a series of questions sent to the student, who, through him, should answer them by recording a video, using the same platform as the remote classes. The analysis included objective and subjective questions that sought to investigate the students' point of view regarding the method, under various aspects such as communication skills, level of anxiety, quality of the study environment and connectivity. As well, to the comparison with the concepts of assessments from the pre-pandemic period. The results showed that the method was positive when it provides the student with a moment of learning during the assessment. Also observed that there was a good acceptance of the assessment method and students started to prefer it over the use of conventional assessment platforms. It can be concluded that the activity demystifies the punitive character of the assessments as it allows the student to develop a reflection on the knowledge acquired during the course, as well as the gaps found in the teaching and learning process. In addition to improving communication skills so used in medical practice.
Keywords: Morphofunctional Sciences; Evaluation; COVID-19.

Resumo
A pandemia causada pelo COVID-19 trouxe grandes desafios para as instituições de ensino superior, tanto professores quanto alunos tiveram que se adaptar rapidamente às aulas remotas. Metodologias foram desenvolvidas para melhorar a interação dos professores com seus alunos, mas os processos de avaliação realizados remotamente eram muitas

vezes difíceis e pouco eficazes. Esta pesquisa buscou avaliar a percepção de estudantes de medicina sobre uma experiência avaliativa inovadora realizada durante o período de pandemia. A avaliação consistia em uma série de perguntas enviadas ao aluno, que, por meio dele, deveria respondê-las gravando um vídeo, utilizando a mesma plataforma das aulas remotas. A análise incluiu questões objetivas e subjetivas que buscaram investigar o ponto de vista dos alunos sobre o método, sob diversos aspectos como habilidades de comunicação, nível de ansiedade, qualidade do ambiente de estudo e conectividade. Bem como, à comparação com os conceitos de avaliações do período pré-pandemia. Os resultados mostraram que o método foi positivo ao proporcionar ao aluno um momento de aprendizado durante a avaliação. Observou-se também que houve uma boa aceitação do método de avaliação e os alunos passaram a preferi-lo ao uso de plataformas convencionais de avaliação. Pode-se concluir que a atividade desmistifica o caráter punitivo das avaliações, pois permite que o aluno desenvolva uma reflexão sobre os conhecimentos adquiridos durante o curso, bem como as lacunas encontradas no processo de ensino e aprendizagem. Além de melhorar as habilidades de comunicação tão utilizadas na prática médica.
Palavras-chave: Ciências Morfofuncionais; Avaliação; COVID-19.

Resumen
La pandemia provocada por el COVID-19 trajo grandes desafíos a las instituciones de educación superior, tanto docentes como estudiantes debieron adaptarse rápidamente a las clases remotas. Se desarrollaron metodologías para mejorar la interacción de los profesores con sus alumnos, pero los procesos de evaluación llevados a cabo de forma remota a menudo eran difíciles y poco efectivos. Esta investigación buscó evaluar la percepción de los estudiantes de medicina sobre una experiencia evaluativa innovadora realizada durante el período de pandemia. La evaluación consistió en una serie de preguntas enviadas al alumno, quien, a través de él, debía responderlas grabando un video, utilizando la misma plataforma que las clases a distancia. El análisis incluyó preguntas objetivas y subjetivas que buscaban indagar el punto de vista de los estudiantes sobre el método, bajo varios aspectos como habilidades de comunicación, nivel de ansiedad, calidad del ambiente de estudio y conectividad. Asimismo, a la comparación con los conceptos de evaluación del período previo a la pandemia. Los resultados mostraron que el método fue positivo cuando brinda al estudiante un momento de aprendizaje durante la evaluación. También observó que había una buena aceptación del método de evaluación y los estudiantes comenzaron a preferirlo al uso de plataformas de evaluación convencionales. Se puede concluir que la actividad desmitifica el carácter punitivo de las evaluaciones ya que permite al estudiante desarrollar una reflexión sobre los conocimientos adquiridos durante el curso, así como los vacíos encontrados en el proceso de enseñanza y aprendizaje. Además de mejorar las habilidades comunicativas tan utilizadas en la práctica médica.
Palabras clave: Ciencias Morfofuncionales; Evaluación; COVID-19.

1. Introduction

For more than five decades, medical education has been receiving recurrent criticism regarding its curriculum (Nogueira, 2009). Due to these criticisms, the curriculum of medical courses in Brazil has increasingly explored active methodologies as a way to better integrate content (Chagas et al., 2018; Silva et al., 2019). Such methodologies can and should make use of new technologies that have been developed, as well as assist in remodeling the teaching and learning process, as well as in the assessment process (Fornaziero & Gil, 2021).

The evaluation process in the medical course has a great impact because it fulfills one of the most important functions: obtaining information about the development of skills and competences from the knowledge acquired in each stage of the medical education process (Troncon, 1996). With this information obtained, the teacher can make decisions aimed at improving the educational process, aiming to improve the sedimentation of knowledge and the gaps that may still exist (Troncon, 1996). On the other hand, the assessment process itself should also be a reassessed aspect, being able to follow the development of technologies and changes in the personality of new generations of students (Côrtes Júnior et al., 2020).

After the changes applied by the new guidelines of the Ministry of Education and Culture (MEC) (Brazil, 2014), it is necessary to restructure the curriculum of basic subjects, to compensate for the reduction in their workload (Marcuzzo et al., 2019). The disciplines that involve morphofunctional knowledge are considered one of the most relevant within the curriculum of the medical course, as they introduce students to the macro and microscopic constitution of the human body (Bastos & Proença, 2000).

The evaluation method that is widely applied within Brazilian universities is called “evidence”. This method is an

assessment process consisting of a single assessment, carried out through a written and/or practical test composed of norms, goals and criteria. After performing the assessment, it is necessary to provide feedback to students, where the differences between the expected result and the obtained result will be presented. This feedback process, most of the time, is carried out in a test correction format, where the teacher presents the expected feedback for each question, often having a punitive character.

On the other hand, this method has already proven to be outdated in demonstrating the real reach of student learning. Thus, assessing cognitive development through "cognitive assessment" has proven to be increasingly effective as an evaluative method, but it is also necessary to assess the formative conducts "formative assessment" throughout the teaching and learning process. Courses that have adopted plural curricula seeking interdisciplinarity and with greater implementation of active methodologies favor the cognitive and training development of their students, valuing all stages of the process.

In the year 2020, the world underwent an extreme change that was brought about by the COVID-19 pandemic. The pandemic limited traditional teaching methodologies, due to the inability to be in person in the classroom with students, making remote teaching in all Brazilian medical schools (Gomes et al., 2020). On the other hand, it ended up opening doors and windows of opportunity in the development of active teaching methodologies (Arruda & Siqueira, 2021). Active methodology has had a positive impact on learning from the perspective of students and teachers (Silva et al., 2019), but it should not be limited to teaching but also to the evaluation process.

Little has been explored about these methodologies within the students' evaluation process, even though this is a point that most needs to be reassessed and restructured. Furthermore, within the Morphofunctional Sciences, there is an even greater scarcity in the development of new evaluative processes that are aimed at the student to learn how to learn. Thus, works that add new ideas and perspectives regarding the application of new evaluation methods, which are not limited to the current situation, will add positively to the improvement of the teaching-learning process. Thus, this work aims to assess the perception of medical students about the cognitive evaluative method in Morphofunctional Sciences developed during the COVID-19 pandemic.

2. Methodology

This research has both a qualitative and a quantitative nature. The qualitative approach, of the descriptive type, used the discourse analysis for the elaboration of categories, in order to understand the investigated questions, from the perspective of the participants. According to Minayo (2010), qualitative research responds to particular questions of a study, with a level of reality that cannot or should not be quantified. That is, it works with the universe of meanings, motives, aspirations, beliefs, values and attitudes.

With regard to the quantitative approach, we sought to evaluate the mean and standard deviation of students' concepts after cognitive assessment in the pre-pandemic period and during the pandemic, using the alternative method. For Teixeira (2007, p. 136), quantitative research "[...] uses mathematical description as a language, that is, mathematical language is used to describe the causes of a phenomenon [...]".

This was a cross-sectional study that took place at a higher education institution in the state of Santa Catarina, Brazil, after approval buy Ethics Committee for Human Beings under CAAE number 52897721.1.0000.5676. The evaluated population consisted of students from the third and fourth phases of the Medicine course of the 2020.1 semester (period of remote activities), totaling 61 students. As a curricular component we use the Morphofunctional discipline, specifically the third curricular unit of each stage. To analyze the teaching and learning process of these students, a cognitive assessment was prepared with questions written in the Powerpoint 2010 program - Microsoft Windows. Where for the third phase the questions addressed the contents of anatomy, histology, embryology and radiology during the aging process. For the fourth phase, the contents dealt with anatomy, embryology, histology, pathology and radiology in diseases resulting from damage to the

environment.

This activity was then posted on the Google Classroom educational platform and from that moment on, each student had four hours to complete. The evaluation had the following steps: reading, reflection and study of the questions; recording a video with the answers using the Google Meet platform, with the camera open, where the student should project their screen with the file provided by the teachers without alteration; posting the video on the educational platform; analysis, feedback and the concept of individual teachers. At the end of the activity, the student was invited to answer the assessment perception questionnaire via Google Forms, which addressed questions about the level of anxiety during the assessment and the triggering factors, the environmental conditions for performing the assessment, accessibility and technological resources, time to build answers, communication skills and the positive and negative points of the evaluative experience.

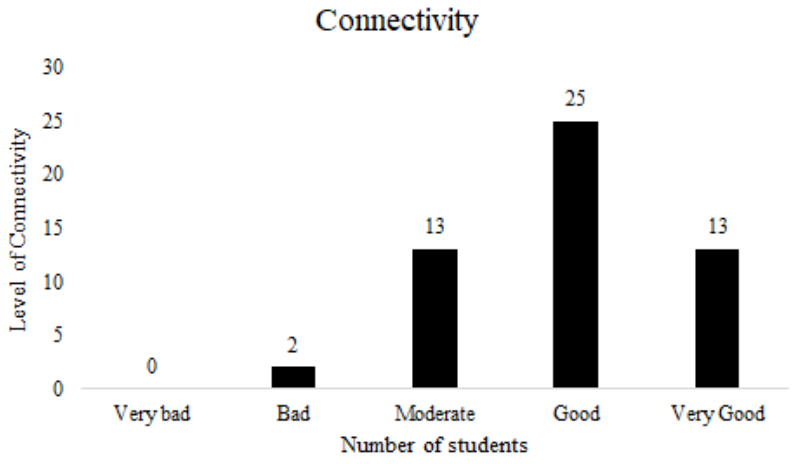
Data were compiled and analyzed qualitatively through conventional content analysis with category formation. The concepts of semester 2020.1 were compared quantitatively with the previous semester, 2019.2 which took place in person, that is, when students were evaluated in the traditional way. For the analysis of descriptive statistics, the Kolmogorov-Smirnov normality test was used, presenting a non-parametric distribution. And since these are two unpaired samples, the Mann-Whitney test was chosen to verify the mean and standard deviation, all performed using the GraphPad Prism software (Prism V.8.2.1, 2019), with p values < 0,05 considered statistically significant.

3. Results and Discussion

Of the 61 responses collected, 32 refer to the third phase and 29 to the fourth phase. 65.62% (n=21) were women, 34.38% (n=11) were men and 68.96% (n=20) were women and 31.04% (n=09) were men in the respective phases. The average age in the third stage was 23 years and in the fourth stage 24 years.

To carry out the evaluation process, it was of fundamental importance that the student had a good quality of internet connectivity in their home. Figure 1 shows the students' assessment of the level of internet connectivity, where 25 students judged it to be good, 13 very good, 13 students judged it to be moderate and only 2 students judged their connectivity quality to be poor.

Figure 1 - Internet connectivity assessment.

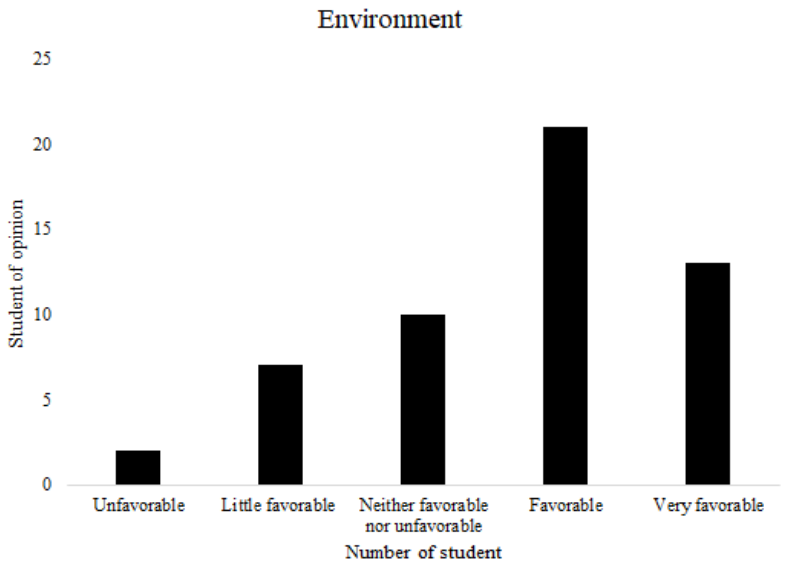


Source: Authors (2021).

As for the environment where the student performed the assessment (Figure 2), 13 judged it to be very favorable, 21

judged it as favorable, 10 said it was neither favorable nor unfavorable, 7 students judged it as unfavorable and only 2 said it was unfavorable.

Figure 2 - Quality of the evaluation execution environment.

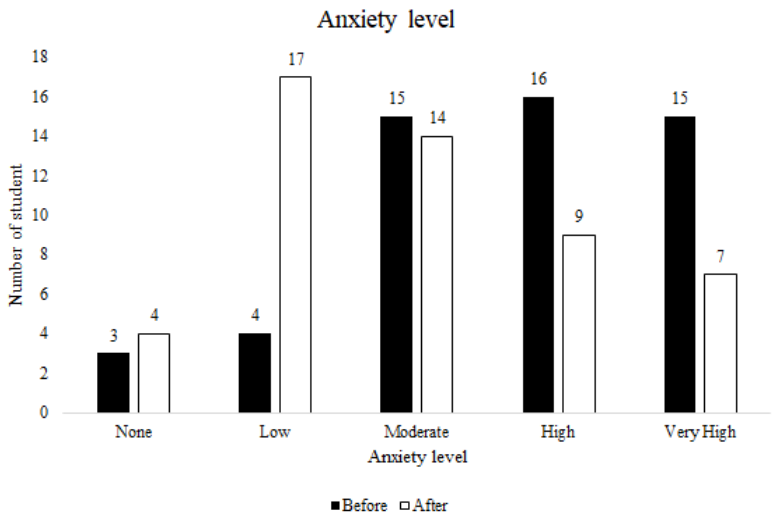


Source: Authors (2021).

The data in Figure 3 show the student's perception of their level of anxiety before and after the assessment, it is observed that: before the assessment, 15 students judged their anxiety level to be very high, 16 judged it to be high, 15 judged moderate, 4 judged it as low and 3 said they were not anxious.

Regarding the level of anxiety after the assessment, 7 students said it was very high, 9 considered it high, 14 judged it as moderate, 17 judged it to be low, and 4 thought they were not anxious.

Figure 3 - Level of anxiety before and after the assessment.



Source: Authors (2021).

For the statistical analysis of the concepts of students from semester 2019.2 and 200.1 were coded, being considered

Sufficient (2) and Needs Improvement (1). Table 1 shows a statistically significant difference between the concepts of remote assessment when compared to the traditional one for the third and fourth phases ($p<0.05$).

Table 1. Analysis of face-to-face versus remote evaluation concepts.

	Concepts 2019.2 Presential		Concepts 2020.1 Remote		
	Mean	SD	Mean	SD	*p*
Third phase	1,625	0,4919	1,938	0,2459	0,0052*
Fourth phase	1,444	0,5064	1,897	0,3099	0,0004*

SD: Standard deviation; *p<0,05. Source: Authors (2021).

3.1 Technological resources used and connectivity

The investigation of the student's accessibility to good computer equipment and good internet connectivity was necessary. These elements could serve as a barrier to the engagement of remote activities, as well as the proposal of the evaluation process (Garbe et al., 2020).

In our study, we did not observe any problems with technological resources, since, as shown in Figure 1, all students had internet connection in their homes and a computer with built-in microphone and webcam. Only 2 students judged their connection bad, and despite that they managed to complete the task.

3.2 Evaluation environment

The home became the central environment for education during the pandemic and was the preferred location for some students. However, teachers were most often not aware of what "going home" meant to them, as they had to leave their educational institutions involuntarily (Schwartzman, 2020), in addition to a familiar environment. it can aggravate the socio-economic differences of students (Díaz, 2021).

As shown in Figure 2, the data show that most students in our sample felt comfortable performing the remote assessment in their home environment. As we can see in the following reports:

> *"I feel favored for being at home, in comfort, in a calm environment, and especially for having time before recording the video for consultation..."*
> *'My room is quiet and my parents respect times when I say I'm busy'.*

According to Shim (2020), the home, remote learning environment is comfortable for most students, which can be an important element that positively affects academic performance.

3.3 Anxiety

Graduate students faced a high level of anxiety during the pandemic caused by COVID-19 (Dangi & George, 2020; Hasan & Bao; 2020; Sundarasen et al., 2020). According to Srivastava et al., (2021), although students are adept at using technologies and the internet, excessive use of screens during remote classes aggravated anxiety during the pandemic (Srivastava et al., 2021).

In our study, 15 students reported a very high level of anxiety, and 16 reported it to be high in the pre-assessment period. Our data are similar to Senel's (2021), which show students concerned with the assessment performed remotely (Senel & Senel, 2021). As we can see in the quotes below.

"I was anxious because the method was different, talking to the camera, not being able to change my answer after recording unless I did the recording again".
"Not knowing exactly how I would perform this way, and how the questions would be, but after reading everything and mentally organizing myself with the answers, I was able to reduce the anxiety to speak in the video."

The level of anxiety displayed by some students after the assessment (7 very high, 9 high and 14 moderate) seems to be linked to concern with their performance.

"I felt anxious not knowing exactly how I would be assessed and not knowing if I was doing it correctly."

3.4 Communication skill

According to the DCN of the Medicine course, student assessments are based on knowledge, skills, attitudes and curricular content developed (Brasil, 2014). The evaluative method used in this research sought to provide an opportunity for learning when the student was faced with questions in which they did not have the necessary curriculum knowledge to answer them, triggering an attitudinal movement in search of that subject. As well as the ability to communicate during video recording, which is necessary for future physicians.

As we can see in the following lines:

"...it allowed me to acquire new skills in public speaking, I'm not very good at it and I needed to "study myself" to get the best result from this experience".
"I studied more, developed/practiced my clinical reasoning, had fun studying/recording/reviewing video and the main thing when I was recording, I imagined myself explaining to my colleagues or to patients. Thus, it expanded my speech capacity..."
"I've always believed that the moment we manage to explain the content to someone else, it's because we really learn... and that's what the oral assessment was, we explaining the answers".

Communication skills are associated with high reflective capacity, communicating properly with co-workers, patients and their families, informing and educating them through appropriate techniques, as well as promoting scientific knowledge for the community.

Currently, the development of good communication skills among physicians has been associated with increased patient satisfaction, a reduced number of malpractice suits, and better results in the therapeutic process. The need for communication skills training should involve not only transferring theories, but also shaping students' beliefs and attitudes to increase the likelihood of their use in future practice (Przymuszała et al., 2021).

3.5 Assessment as a learning tool

An important point of the evaluative method addressed in the work was the possibility for the student to learn while recording their video, since, having access to the questions, they could review topics they did not know before starting their recording, demystifying the evaluative process as something punitive but part of the teaching and learning process. To investigate this category, students answered the following question: During the time of construction of your answers, did you learn something new? Below are some of the responses obtained:

"A lot, and I confess that some things I looked at in the material as it was written, and in that moment I learned a lot".
"I learned a lot, my concentration was 100% focused on the subject".
"I created doubts that I didn't have before".

Even in standard assessment situations based on tests taken by the teacher or external exams, students not only demonstrate what they have learned, but also learn new things, in this sense, the assessment continuously affects the student's learning in training (Allal, 2010).

3.6 Academic performance pre and post pandemic

Medical student education during the Covid-19 pandemic was very different from the standard education we were used to, creating challenges for both educators and students. As we broke into this new terrain, it became necessary to adapt new methods of both teaching and assessment (Prigoff et al., 2021).

Therefore, in this research, we sought to compare the performance of students in pre and post pandemic assessments, that is, in a traditional written assessment method compared to the oral video method during the remote period. It is possible to affirm that this one obtained better results, presenting a statistically significant difference between the concepts when compared to the traditional one for both the third and fourth phase.

The diversity of the assessment instrument provided teachers with a broader view of the teaching and learning process, in addition to developing students' communication, creativity, synthesis and reflection skills and inducing prior study before recording the video, demystifying the assessment process as something punitive. As we can demonstrate in the following testimonials:

> *"During the answers, at every moment I had time to question myself if I was safe with what I had prepared as an answer and if it sounded good when spoken, this brings a new perception of what will be answered, which improved me in learning, better punctual situations, showed better my insecurities in that matter and allowed me to reduce the number of errors by the simple fact of not responding on impulse, but responding with good reasoning (which requires more elaborate thinking)".*
> *"I believe that the assessment is the time to observe the learning gaps, which have already been solved during the activity".*
> *"I felt that I learned and solidified content, teachers can assess the way we think to answer the questions, which does not happen in paper assessment".*
> *"New experience that provided a different point of view on evaluations; I could learn more by explaining the issues".*

4. Conclusion

We believe in dynamic and innovative pedagogical transformations, which guide us in decision-making, and which address contemporary educational challenges, just as we experienced during the pandemic period.

Thus, we can conclude that the evaluation method performed in the Covid-19 pandemic is satisfactory. The main reasons are that the activity allows the student to develop communication and expression skills, in addition to demonstrating the knowledge acquired during the course. Therefore, we recommend this form of assessment not only in times of social isolation, but also an integral part of the training of future physicians.

We observed that the punitive character of the evaluation system is still very much in the culture of our students and teachers. The search for the demystification of this process is daily. Higher education institutions, especially medical schools, need permanent training for teachers who seek to evaluate the learning objectives developed in the classroom, as well as the individual gaps of each student, mapping the profile of these teachers is something to be thought about. A study of students' perception of the various forms of assessment would be the beginning to list creative and innovative assessment methods that could be used at the beginning of school life.

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