ANALYSIS OF FACTORS THAT INFLUENCE SATISFACTION OF BRAZILIAN MEDICAL STUDENTS IN REMOTE AND FACE-TO-FACE LEARNING MODALITIES

ANÁLISE DOS FATORES QUE INFLUENCIAM A SATISFAÇÃO DE ESTUDANTES DE MEDICINA BRASILEIROS NAS MODALIDADES DE ENSINO REMOTO E PRESENCIAL

ANÁLISIS DE LOS FACTORES QUE INFLUYEN EN LA SATISFACCIÓN DE ESTUDIANTES DE MEDICINA BRASILEÑOS EN LAS MODALIDADES DE ENSEÑANZA REMOTA Y PRESENCIAL

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How to reference this article:

GAMBA LIMA, C.; ALONSO, D. de O.; MACHADO JUNIOR, C. Analysis of factors that influence satisfaction of Brazilian medical students in remote and face-to-face learning modalities. **Revista Ibero-Americana de Estudos em Educação**, Araraquara, v. 18, n. 00, e023140, 2023. e-ISSN: 1982-5587. DOI: https://doi.org/10.21723/riaee.v18i00.17904

| **Submitted**: 27/03/2023
| **Revisions required**: 03/05/2023
| **Approved**: 18/06/2023
| **Published**: 19/12/2023

Editor: Prof. Dr. José Luís Bizelli
Deputy Executive Editor: Prof. Dr. José Anderson Santos Cruz

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ABSTRACT: Students satisfaction is the difference between their expectations and personal perceptions of quality. This quantitative research aimed to investigate which factors best explain the satisfaction of students when subjected to different teaching modalities. The sample came from a Brazilian Medicine course that uses problem-based learning. The time frame was the second semester of 2020, during social isolation and use of remote modality (n=249), and the second semester of 2021, after returning to face-to-face classes (n=249). Regression analysis indicated that satisfaction was explained by different factors, depending on the teaching modality. In the remote modality, satisfaction was influenced by the "Student" factor (57.1%), dependent on teacher stimulation. However, in the face-to-face modality, satisfaction was influenced by the "Class" factor (57.3%), related to student protagonism and teacher attitudes in the learning process.

KEYWORDS: Institutional self-assessment. Satisfaction. Higher Education. Medical education. Remote learning.

***RESUMO**: A satisfação do aluno decorre da comparação entre suas expectativas e a percepção pessoal de qualidade. Esta pesquisa quantitativa objetivou investigar quais fatores melhor explicam a satisfação dos estudantes submetidos a diferentes modalidades de ensino. A amostra é de um curso de Medicina brasileiro que utiliza aprendizagem baseada em problemas. Os recortes temporais foram o segundo semestre de 2020, durante o isolamento social e emprego da modalidade remota (n=249), e o segundo semestre de 2021, após o retorno às aulas presenciais (n=249). A análise de regressão indicou que a satisfação foi explicada por diferentes fatores em função da modalidade de ensino. Na modalidade remota, a satisfação foi influenciada pelo fator "Aluno" (57,1%), dependente do estímulo do professor. Já na modalidade presencial foi influenciada pelo fator "Aula" (57,3%), mais relacionada ao protagonismo do aluno e às atitudes do docente no processo de aprendizagem.*

***PALAVRAS-CHAVE**: Autoavaliação institucional. Satisfação. Ensino Superior. Educação médica. Educação remota.*

***RESUMEN**: La satisfacción del estudiante se alcanza a partir de la comparación entre sus expectativas y su percepción personal de la calidad. Esta investigación cuantitativa buscó investigar qué factores explican mejor la satisfacción de los estudiantes sometidos a diferentes modalidades de enseñanza. La muestra viene de una carrera de Medicina en Brasil que utiliza el aprendizaje basado en problemas. El recorte temporal fue el segundo semestre de 2020, durante el aislamiento social y el uso de la modalidad remota (n=249), y el segundo semestre de 2021, después del regreso a las clases presenciales (n=249). El análisis de regresión indicó que la satisfacción fue explicada por diferentes factores en función de la modalidad de enseñanza. En la modalidad remota, la satisfacción fue influenciada por el factor "Alumno" (57,1%), dependiente del estímulo del profesor. En cambio, en la modalidad presencial, la satisfacción fue influenciada por el factor "Clase" (57,3%), más relacionado al protagonismo del estudiante y las actitudes del docente en el proceso de aprendizaje.*

***PALABRAS CLAVE**: Autoevaluación institucional. Satisfacción. Enseñanza Superior. Educación médica. Educación remota.*

Introduction

The scope of action of Higher Education Institutions (HEIs) includes professional training, through the development of skills and competencies, which enable access to the job market. The increase in the number of HEIs and vacancies in Brazil established greater competitiveness and intensified educational marketing strategies to obtain student preference (SILVA *et al*., 2018). The accreditation of Brazilian HEIs is carried out with the Brazilian Ministry of Education (MEC), using quality indicators. Institutional self-assessment (AI) is one of these indicators, and must be developed by the HEI (SILVA *et al*., 2019).

In addition to the intensification of competition and the increase in requirements for accreditation with the MEC, from the first two decades of the 21st century, the undergraduate medical course has been undergoing changes in the models of teaching offered to guide the training of critical, reflective professionals and self-employed (MACHADO; OLIVEIRA; MALVEZZI, 2021). These changes encouraged HEIs that maintain medical courses to direct their pedagogical projects towards innovative models based on active methodologies (MACHADO; OLIVEIRA; MALVEZZI, 2021; MORETTI-PIRES *et al*., 2021).

The intangible nature of educational services makes it difficult for students to choose which HEI to attend. The student brings with him a set of expectations, which he hopes will be met. In this context, the medical student, one of the longest and most expensive courses in the country, carries a series of expectations and compares them with the perceived quality of the educational services delivered by the HEI, creating their concept of satisfaction (SILVA et *al.*, 2018; PEREIRA FILHO *et al*., 2019).

Satisfaction has been used to try to explain learning, academic development, evaluate loyalty, quality and value perceived by the student in the relationship with their HEI, supporting educational marketing actions (OSTI; ALMEIDA, 2022). In the literature, a gap is identified in the approach of studies that relate student satisfaction with AI results or teaching modalities.

Due to the COVID-19 Pandemic, social isolation was established with the suspension of face-to-face classes (BRASIL, 2020). This contingency imposed on HEIs the need to adapt to maintain services, using strategies already known from distance education, use of platforms and Digital Information and Communication Technologies (TDIC) to transmit synchronous classes and provide support materials (RECH; PESCADOR, 2020; BRITO; LOBO DA COSTA; DINIZ, 2022). After the most critical period, in 2021, the possibility of returning to face-to-face classes created the need to define strategies to return from remote education (ER) to face-to-face education (EP). This fact required readaptation and may have influenced the

students' perception and, consequently, their satisfaction with the learning process and the course.

In this panorama, the question that guides this research is: which factors best explain student satisfaction when changing the teaching modality during the course? Thus, the objective of this study was to investigate which factors best explain students' satisfaction with the medicine course, in the form of remote teaching, used during the COVID-19 pandemic, and in-person teaching, after the return of classes.

The use of secondary AI data, captured during the period of the COVID-19 global health emergency, as an opportunity to seek to uncover the influence of different teaching modalities, remote and in-person, on student satisfaction with their course. For the academic community, knowledge can be created to fill a gap, since there are few studies that work from this perspective. For educational marketing, it can be a source of ideas for making strategic decisions.

The research was organized into five sections. The first is an introduction; the second presents the theoretical framework; the third presents the outline of the method; the fourth brings with it the results and discussion; the fifth and final section discusses the final considerations of this study.

Theoretical foundation

The MEC is the national regulatory body for accreditation and accreditation of HEIs. Among its responsibilities, it identifies promoting and improving the quality of higher education in Brazil, acting through the National Higher Education Assessment System (SINAES), which uses indicators such as institutional assessments (internal self-assessment and external assessment), course evaluation degree and National Student Performance Examination (ENADE) (SILVA *et al*., 2019). Institutional self-assessment was established by Law No. 10,861 of April 14, 2004, of a mandatory nature, developed by the Own Assessment Committee (CPA), with the aim of contributing to the Institutional Development Plan (PDI), in order to improve the quality of education offered by the HEI (SILVA *et al*., 2019).

The diagnoses extracted from AIs, taking advantage of their regular and mandatory nature, can be used as indicators to define educational marketing strategies, to seek to meet students' expectations and maximize the perceived quality of institutional services (SILVA *et al.*, 2018; PEREIRA FILHO *et al.*, 2019). According to Assis, Moura and Alves (2020),

perceived quality influences the student's contentment with the course, while the price or amount paid by the student, access and location of the HEI and the dissemination strategies of the HEI and its courses are the variables that are least related to satisfaction.

The intangible and prolonged nature of educational services makes it difficult to identify attributes that explain the quality perceived by the student (PEREIRA FILHO *et al.*, 2019). The student chooses the HEI based on the information available on the market, which, in turn, creates a series of expectations. Student satisfaction arises from the comparison of their expectations with the academic experience, creating a personal perception of the quality of the course and the HEI. Student satisfaction is, then, the effect of the difference between their expectations and what they understand as received and assimilated (SILVA *et al.*, 2018; PEREIRA FILHO *et al.*, 2019; ASSIS; MOURA; ALVES, 2020).

Learning is a process that considers the subject's experience to acquire knowledge, involving individual learning methods and styles (MEURER *et al*., 2018). As it is individual, each student has their own learning style based on previous experiences. Therefore, the inclusion of TDIC in the educational process tends to be preferred by those who have learning styles aligned with autonomy and innovation, as it reinforces the potential for self-learning, proactivity and organization (VIANA; RAMOS; ROZA, 2021). The change in teaching modality with the inclusion of TDIC involves a paradigm shift and requires institutional support in training teachers and students for the new educational structure. If it is enough for the student's learning style to be dissociated from the teacher's teaching style to lead to the student's lower academic performance (GRESELE; OBANA; SANTI, 2022), it is quite possible that the change in methodology or teaching modality, or the unplanned insertion of TDIC, may impact students' perception of quality and satisfaction.

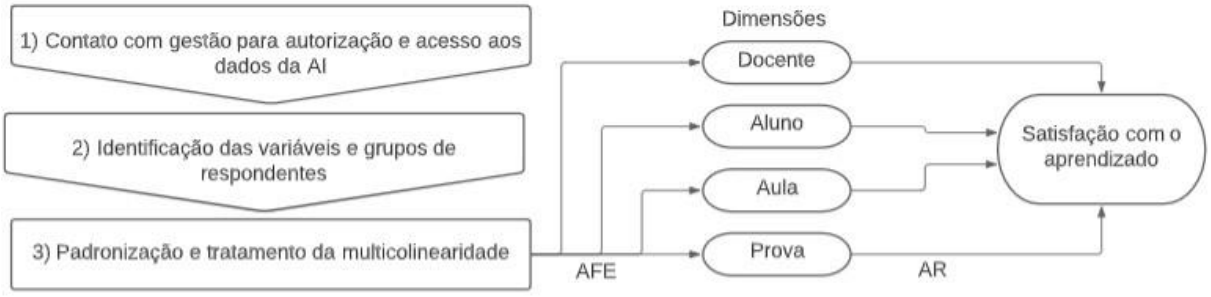
The rapid migration to ER during the COVID-19 pandemic interfered in the teaching-learning relationship by incorporating TDIC, changing the nature of the activities and responsibilities of each agent in the process (RECH; PESCADOR, 2020; BRITO; LOBO DA COSTA; DINIZ, 2022). Rech and Pescador (2020, p. 1269, our translation) warn about an attitude of "[...] doing for the sake of doing [...]", which reduced the teacher-student relationship to the act of sending and receiving information, excluding teaching styles, learning and autonomy common in face-to-face teaching processes. From this perspective, studies conducted with medical students during the Pandemic period with ER show student satisfaction with learning (FOSSA *et al*., 2020), despite the perception that this learning was less productive

(CAMPOS FILHO *et al*., 2022) and the occurrence of lower performance scores (FOO; CHEUNG; CHU, 2021), compared to EP.

Method

This research is characterized as explanatory and quantitative, as it seeks to explain the factors that determined student satisfaction with their course, using statistical methods of multivariate analysis. Since it used secondary AI data developed by the management of a curricular unit (UC) of the pre-internship period of a Medicine course, it is classified as non-interfering and *ex-post facto* (GIL, 2019).

Figure 1 – Methodological steps and procedures used for the AIs studied (ER and EP)



Caption: EFA = exploratory factor analysis; AR = multivariate regression analysis.
Source: Prepared by the authors based on research results

The pedagogical project of the Medicine course studied considers the development of skills based on active methodologies, in particular ABP, organized in semester-long modular UCs and not in subjects, and divided into two periods, pre -internship and internship. The observations were extracted from the AI database of a practical medicine laboratory UC at an HEI in the southeast region of Brazil. The UC was chosen for convenience, for the following reasons: (i) to present itself as a regular and transversal business unit for the entire pre -internship period of the course, with its own physical space, teaching staff and coordination; (ii) granting management authorization to access the AI results spreadsheets by groups, without individual identification of the respondents or the HEI; and (iii) having performed the AI systematically, every six months and as a UC diagnostic tool, even during the period of social isolation during the COVID-19 pandemic.

The first time frame of the study focuses on AI data from the second semester of 2020 (AI_202-R), which had as a strategy the remote modality to maintain the offering of classes in response to the rules of social isolation, with the actors adapted by the experience since the

beginning of that year. The representative data for the in-person modality were extracted from the AI for the second semester of 2021 (AI_212-P), in which classes were in-person for the entire period. The responding classes were those enrolled from 2nd to 5th stage of the course, during the 2nd semester of 2020 and monitored in the 2nd semester of 2021. The incoming class (1st stage) was discarded to avoid bias linked to previous inexperience with the course methodology.

AI database was provided for this study with permission from the UC and course management, preserving the anonymity of the respondents and those evaluated. Originally, AI is made up of several variables, and those that aimed to collect the opinion of students regarding the evaluation of their own attitudes, of teachers, of the classes offered and of the knowledge assessment instrument were chosen for this study, in addition to the variable " Satisfaction with the learning developed in classes". The AI instrument uses a bipolar semantic differential scale, with a score of zero to ten points for each variable, in an interval format, digitally self-completed using *Google* © Forms, applied at the end of the academic semester. According to Gil (2019), some social research variables can be measured with interval scales that allow the use of statistical measures of central tendency and significance tests.

To standardize the data, the variables were transformed into *z-scores* and then we sought to verify the presence of missing data *and* discrepant values (*outliers)* multivariate by Mahalanobis distance (D2) and significance level of 0.001. The reduction of the total variables by exploratory factor analysis was necessary to treat multicollinearity, preparing the data set to use multivariate regression analysis (AR) (HAIR JUNIOR *et al*., 2009). The four factors extracted from the AIs for use as independent variables were: (i) teacher, (ii) student, (iii) test and (iv) class, composed to represent the variables grouped in more than 65.9%. Finally, the AR sought to find a mathematical relationship between the factors of each AI with the dependent variable "Student satisfaction with the knowledge developed in the semester", to test the hypothesis: student satisfaction is explained by different factors when comparing the modality ER with EP. For statistical analyzes the IBM SPSS *software (Statistical Package for the Social Sciences*), version 25.

Results and discussion

The analyzed data set comprises 498 observations, 249 from each AI studied. As this is a sampling based on secondary and anonymous data, despite presenting the same number of respondents per class in 2020 and 2021, the data are not paired.

Table 1 – Average scores (grades 0 - 10) for student satisfaction with learning and for the constructs extracted from AI in remote (n=249) and in-person (n=249) modalities

	Satisfaction		Teaching Factor		Student Factor		Proof Factor		Class Factor	
	Rem	Pre	Rem	Pre	Rem	Pre	Rem	Pre	Rem	Pre
Average	7.88	7.01	8.59	8.95	5.91	9.19	8.06	8.10	9.11	7.76
DP	1.71	2.19	1.49	0.86	1.67	0.86	1.58	1.46	1.00	1.46

Caption: Rem=Remote; Pre =In-person; N=number of respondents; SD=standard deviation
Source: Prepared by the authors based on research results

Regarding satisfaction with learning (Table 1), students showed positive perceptions for the two types of education studied, since the averages were higher than 7.0 on the scale of 0.0 to 10.0 points, slightly higher for ER. The results presented in Table 1 are consistent with those found in previous studies, in which satisfaction scores were above the midpoint (50th percentile) and close to or higher than the 70th percentile (ALCÂNTARA *et al.,* 2012; FADEL *et al.,* 2018; SILVA *et al*., 2018; ALBUQUERQUE *et al.,* 2019; ASSIS; MOURA; ALVES, 2020; PEREIRA-NETO; FARIA; ALMEIDA, 2022). Research that used a satisfaction scale to evaluate aspects of the HEI, the course and the opportunities offered, found higher satisfaction scores in the "course" dimension, a factor that concentrates variables similar to those in this study (ALCÂNTARA et *al.,* 2012; FADEL *et al.,* 2018; ALBUQUERQUE *et al.*, 2019; ASSIS; MOURA; ALVES, 2020; OLIVEIRA *et al.,* 2021b).

We applied AR to test the hypothesis that student satisfaction with their course is influenced by different factors when using remote or in-person teaching. All observations from AI_202-R (VIF<1.5) and AI_212-P (VIF<1.1) were adequate, with significant zet values ($p<0.05$) and absence of multicollinearity. As shown in Table 2, for this group of medical students (n=249), the AR confirmed that the four factors identified from the AIs explain students' satisfaction with learning by 49.5% ($p<0.01$; d=2.016) of the data variance for ER and 51.3% ($p<0.01$; d=2.091) for EP. Additionally, the Durbin -Watson test (d) between 1.5 and 2.5 confirms the absence of linear autocorrelation (HAIR JUNIOR *et al.*, 2009).

Table 2 – Summary of the Linear Regression Model for remote and in-person modalities

Model Summary [d]					
Model	**R**	**R [2]**	**adjusted R2 -**	**Standard error of the estimate**	**Durbin - Watson**
Remote (n=249)	0.704 [to]	0.495	0.487	0.695	2016
In-person (n=249)	0.716b -	0.513	0.505	1,199	2,091

Predictors: (Constant), Student, Teacher, Test, Class
[b] Predictors: (Constant), Class, Teacher, Test, Student
[d] Dependent Variable: Satisfaction with learning developed through remote classes
Source: Prepared by the authors based on research results

In the remote modality, student self-assessment had the highest coefficient (59.1% - Table 3), followed by teachers' skills (26.9%), knowledge assessment - test (23.0%) and class characteristics (12.7%). Student satisfaction in ER is more associated with the evaluation of their perceptions as a consumer of services and dependent on the teacher's encouragement, so that they will be more satisfied the more they are encouraged to take classes and studies, the greater their involvement with the content, prior study, dedication and participation in classes. In ER, the "student" factor added variables that attribute to the teacher the role of agent to encourage participation and show concern about helping to resolve the student's difficulties. In this reasoning, if we consider "student and teacher" together, we can see the importance of the teacher's role in explaining student satisfaction.

The implementation of ER in this course was motivated as a strategy to allow the class to be held and interaction between parties, even with physical distancing. *Online* platforms have limitations in enabling interpersonal proximity in a similar way to what occurs with physical presence. These difficulties, added to those related to the quality of the internet, familiarity with technology, family routine and suitability of the study environment (CAMPOS FILHO *et al.*, 2022) may explain the lower self-motivation and proactivity (FOO; CHEUNG; CHU, 2021). The results of the research by Oliveira *et al*. (2021a) indicate that, despite high marks given for satisfaction with ER, there was an expression of dissatisfaction with remote and virtual classes, a typical occurrence of low adherence and resistance to the model. Rech and Pescador (2020) suggest that academic activities during this period showed little commitment to learning, limited to just complying with the legal obligations of the academic calendar.

Table 3 – Multivariate Linear Regression Coefficients – Remote

Coefficients [a]							
Model	Coef. non-standardized		Coef. standardized	t	Sig.	Collinearity	
	B	Standard error	Beta			Tolerance	VIF
(Constant)	0.036	0.044		0.829	0.408		
Student	0.574	0.044	0.591	13,033	0.000*	1.00	1.00
Teacher	0.269	0.044	0.277	6,101	0.000*	1.00	1.00
Proof	0.223	0.044	0.230	5,062	0.000*	1.00	1.00
Classroom	0.123	0.044	0.127	2,798	0.006*	1.00	1.00

[a] Dependent Variable: Satisfaction with learning.* p<0.01
Caption: Coef. = coefficient
Source: Prepared by the authors based on research results.

Table 4 – Multivariate Linear Regression Coefficients: In-person

Coefficients [a]							
Model	Coef. non-standardized		Coef. standardized	t	Sig.	Collinearity	
	B	Standard error	Beta			Tolerance	VIF
(Constant)	7,880	0.076		103,681	0.000*		
Classroom	0.976	0.076	0.573	12,816	0.000*	1.00	1.00
Teacher	0.516	0.076	0.303	6,776	0.000*	1.00	1.00
Proof	0.491	0.076	0.288	6,450	0.000*	1.00	1.00
Student	0.173	0.076	0.101	2,269	0.024*	1.00	1.00

[a] Dependent Variable: Satisfaction with learning.* p<0.01
Caption: Coef. = coefficient
Source: Prepared by the authors based on research results

When satisfaction with learning developed through EP is analyzed, it is observed that it was explained differently than ER. The class, which in ER was the factor that least explained satisfaction, in EP presented the highest coefficient (57.3% - Table 4), showing that student satisfaction in EP is more strongly associated with the weekly moment of access to the university's collection. IES and your teacher. The variables that made up this construct highlight the student's protagonism during the face-to-face class, as they consider the active search for theoretical information to previously support the class, their involvement in the discrimination and discussion of the items of the practical activity guided in person by the teacher (MACHADO; OLIVEIRA; MALVEZZI, 2021; MORETTI-PIRES *et al.*, 2021).

This result corroborates a study that found, as the main factor in student assessment, the role of the teacher as a facilitator of the transition from theoretical to practical knowledge (SOARES *et al.*, 2021). In an experiment, Brito and Campos (2019) introduced active methodology techniques and identified the occurrence of income gains, reports of greater satisfaction and a state of happiness, greater motivation for classes and studies. They reinforce

that dedication to learning is dependent on motivation for attitudinal learning and the application of various tools. The student's autonomous action, supported by the facilitator, generates a feeling of efficacy and safety, as stated by Oliveira *et al*. (2021b, p. 10) "[...] the more students perceived themselves to be self-effective, the more satisfied they were with the institution".

The teacher's attitudes positively influenced (30.3%) student satisfaction. In the face-to-face modality, students understood that the teacher, in addition to the classic duties of his work activity such as mastery of the topic, attendance, commitment to preparation and quality of explanations, has greater value when he is available and committed to helping with difficulties, as also found in work that highlights the association of these characteristics with student satisfaction (SOARES *et al.*, 2021). Thus, the teacher is characterized as a mediator, partner and facilitator of learning, aligned with the characteristics of the active methodology (MACHADO; OLIVEIRA; MALVEZZI, 2021; MORETTI-PIRES *et al.*, 2021), a fact that could not be observed in ER.

The assessment of knowledge (test), which returns the final grade, contributed positively to satisfaction and in a similar way, both in ER (23.0%) and EP (28.8%), signaling the importance of implementing a transparent, fair and quality assessment process, efficient for the learner to feel evaluated in any teaching modality, in order to increase students' levels of satisfaction with their performance.

When studies were urgently conducted remotely, more than 80% of student satisfaction was explained by student self-assessment (57.4%) and teacher assessment (26.9%). On the other hand, in the face-to-face modality, the characteristics of the class (57.3%) and the teacher's evaluation (30.3%) were the factors that most positively influenced the satisfaction of the same group of students.

It should be noted that the factors "student" and "class" were represented by different variables and have their own meanings between the two modalities. Due to the characteristics of these variables, a passive posture of the student is observed during the ER period, in which the motivation for studying and classes was dependent on extrinsic stimulus from the teacher. It is possible that the obligation to suddenly migrate to the virtual environment may have created the perception of a new reality, with many distractions and increased distance in interpersonal relationships, which may have led to a reduction in motivation, involvement and communication between students (FOO; CHEUNG; CHU, 2021). Upon returning to face-to-face classes, with interpersonal relationships reestablished and access to the HEI's physical

collection, the class potentially assumed greater importance, with the student positioning themselves as co-responsible for learning. In both situations, ER and EP, the teacher's attitude indirectly interfered with learning, fostering the students' characteristics of dependence or autonomy, impacting student satisfaction.

Final remarks

The medical course in this sample is structured using PBL as an active methodology strategy, in person, for the development of skills. The implementation of ER, in response to the health emergency of the COVID-19 pandemic, and the return to EP constituted a model to investigate how student satisfaction with the course is explained, when using two different teaching modalities, remote and in person.

Thus, when analyzing the results and responding to the objective of this study, it is observed that, when comparing the experience of the same group experiencing two teaching modalities, remote and in-person, the satisfaction of these students was explained differently by the same set of factors. In the ER modality, student satisfaction was best explained by the factors "Student" (59.1%) and "Teacher" (27.7%), strongly marked by the influence of teaching activity, such as stimulating and welcoming students, in addition to the regular professional skills. Differently, in the EP modality, student satisfaction was explained by the factors "Class" (57.3%) and "Teacher" (30.3%), showing itself to be conditioned by the student's protagonism, the practical classes and the attitudes of the teacher. This finding signals that HEIs must establish specific planning and strategies for the modality offered.

The AR showed that, in general, regardless of the teaching modality, approximately 55% of student satisfaction with their course is influenced by the reading they do of their assignments and responsibilities in classes, with the engagement of the teaching staff and the resources offered by the IES. The second most influential factor on student satisfaction, around 30%, are the actions and attitudes of teachers. Albuquerque *et al*. (2019) and Alcântara *et al*. (2012) propose that the relationship with teachers, mastery of the content, teacher availability and class strategy are factors that influence student satisfaction. Teachers are collaborators of the HEI and, therefore, efforts to train and motivate teachers in the exercise of their functions are HEI management strategies. These strategies may be able to encourage teachers to better lead their students, resulting in greater student satisfaction with the course and greater

competitiveness of the HEI (SILVA *et al.*, 2018; PEREIRA FILHO *et al.*, 2019; ASSIS; MOURA; ALVES, 2020).

This research presents some interesting questions, such as the opportunity to study, using AI, the influence of two different teaching modalities on satisfaction, for the same group of 249 students, at two different points in time. On the other hand, it also brings with it some limitations, such as the use of a non-probabilistic sample, based on a curricular unit that represents a cell of just one medical course and originating from a single HEI, conditioning the possibility of generalizing the results.

Another evident limitation is the choice to use secondary data, making it difficult for researchers to analyze, since it was not possible to interfere in the choice of instrument, nor in controlling the collection of responses. On the other hand, the possibility of using AI results, a mandatory indicator for all Brazilian HEIs, also as a guidance instrument for educational marketing strategies, seems to be interesting. The importance of new studies is highlighted, expanding the sample, comparing satisfaction in the initial and advanced semesters of the course, identifying other satisfaction attributes and proposing educational marketing strategies for HEIs.

REFERENCES

ALBUQUERQUE, L. G. M. *et al*. Satisfação com a experiência acadêmica entre estudantes de medicina. **Revista Educação em Saúde,** v. 7, n. 2, p. 101-110, 2019. Available at: http://periodicos.unievangelica.edu.br/index.php/educacaoemsaude/article/view/3916. Access: 15 Nov. 2022.

ALCÂNTARA, V. C. *et al*. Dimensões e determinantes da satisfação de alunos em uma instituição de ensino superior. **Revista Brasileira de Marketing,** v. 11, n. 3, p. 193-220, 2012. Available at: https://periodicos.uninove.br/remark/article/view/11967. Access: 15 Nov. 2022.

ASSIS, R. C. C.; MOURA, G. L.; ALVES, M. A. Satisfação dos estudantes de cursos de gestão de uma instituição superior pública. **ForScience,** Formiga, v. 8, n. 1, e00656, 2020. Available at: http://forscience.ifmg.edu.br/forscience/index.php/forscience/article/view/656. Access: 15 Nov. 2022.

BRASIL. **Portaria n. 343, de 17 de março de 2020**. Dispõe sobre a substituição das aulas presenciais por aulas em meios digitais enquanto durar a situação de pandemia do Novo Coronavírus - COVID-19. Brasília, DF: MEC, 2020. https://www.planalto.gov.br/ccivil_03/portaria/prt/portaria%20n%C2%BA%20343-20-mec.htm. Acesso 15 Nov. 2022.

BRITO, C. A. F.; CAMPOS, M. Z. Facilitando o processo de aprendizagem no ensino superior: o papel das metodologias ativas. **Revista Ibero-Americana de Estudos em Educação**, Araraquara, v. 14, n. 2, p. 371-387, 2019. Available at: https://periodicos.fclar.unesp.br/iberoamericana/article/view/11769/8024. Access: 15 Nov. 2022.

BRITO, C. A. F.; LOBO DA COSTA, N. M.; DINIZ, S. N. Novos gestos didáticos no Ensino Remoto Emergencial: Lições aprendidas na docência em tempos de COVID-19. **Revista Ibero-Americana de Estudos em Educação**, Araraquara, v. 17, n. 1, p. 53-71, 2022. Available at: https://periodicos.fclar.unesp.br/iberoamericana/article/view/14989. Access: 15 Nov. 2022.

CAMPOS FILHO, A. S. *et al*. O ensino remoto no curso de Medicina de uma universidade brasileira em tempos de pandemia. **Revista Brasileira de Educação Médica**, v. 46, n. 01, 2022. Available at: https://www.scielo.br/j/rbem/a/qSpb9PH3SQRyj8ScJLSwSPc/?lang=pt. Access: 15 Nov. 2022.

FADEL, C. B *et al*. Satisfaction with the academic experience among graduate students of a brazilian public university. **Revista Gaúcha de Odontologia**, v. 66, n. 1, p. 50-59, 2018. Available at: https://www.scielo.br/j/rgo/a/KXSZKXJVWv4dJjdMbCFRg7Q/?lang=en. Access: 15 Nov. 2022.

FOO, C.; CHEUNG, B.; CHU, K. A comparative study regarding distance learning and the conventional face-to-face approach conducted problem-based learning tutorial during the COVID- 19 pandemic. **BMC Medical Education,** v. 21, n. 1, p. 1-6, 2021. Available at: https://bmcmededuc.biomedcentral.com/articles/10.1186/s12909-021-02575-1. Access: 15 Nov. 2022.

FOSSA, R. S. *et al*. H. Ensino remoto emergencial em um curso de medicina: avaliação do trabalho docente na perspectiva discente. **Revista Docência do Ensino Superior,** v. 10, e024654, 2020. Available at: https://periodicos.ufmg.br/index.php/rdes/article/view/24654. Access: 15 Nov. 2022.

GIL, A. C. **Métodos e Técnicas de Pesquisa Social**. 7. ed. Rio de Janeiro: Grupo GEN, 2019.

GRESELE, W. D.; OBANA, R. S.; SANTI, W. B. Abordagens de estudo e percepções do ambiente de ensino e aprendizagem em uma instituição de ensino superior brasileira. **Revista de Administração, Contabilidade e Economia**, v. 21, n. 1, p. 7-28, 2022. Available at: https://periodicos.unoesc.edu.br/race/article/view/23190. Access: 15 Nov. 2022.

HAIR JUNIOR, J. F. *et al*. **Análise multivariada de dados**. 6. ed. Porto Alegre: Bookman, 2009.

MACHADO, C.; OLIVEIRA, J. M.; MALVEZI, E. Repercussões das diretrizes curriculares nacionais de 2014 nos projetos pedagógicos das novas escolas médicas. **Interface,** Botucatu, v. 25, e200358, 2021. Available at: https://www.scielo.br/j/icse/a/V3H87bcLY94p5dMFXPqQFKd/?lang=pt. Access: 15 Nov. 2022.

MEURER, A. M. *et al*. Estilos de Aprendizagem e Rendimento Acadêmico na Universidade. **Revista Iberoamericana sobre Calidad, Eficacia y Cambio en Educación**, v. 16, n. 4, p. 23-43, 2018. Available at: https://revistas.uam.es/index.php/reice/article/view/9955. Access: 15 Nov. 2022.

MORETTI-PIRES, R. O. *et al*. Estratégias pedagógicas na educação médica ante os desafios da COVID-19: uma revisão de escopo. **Revista Brasileira de Educação Médica,** v. 45, n. 1, p. e025, 2021. Available at: https://www.scielo.br/j/rbem/a/BB9TpJF7VSszhQRxbxxfvBh/?lang=pt. Access: 15 Nov. 2022.

OLIVEIRA, B. R. *et al*. Implementação da Educação Remota em tempos de pandemia: análise da experiência do estado de Minas Gerais. **Revista Ibero-Americana de Estudos em Educação**, Araraquara, v. 16, n. 1, p. 84-106, jan./mar. 2021a. Available at: https://periodicos.fclar.unesp.br/iberoamericana/article/view/13928. Access: 15 Nov. 2022.

OLIVEIRA, V. P. *et al*. Autoeficácia no ensino superior e satisfação com as experiências acadêmicas: percepções de estudantes de educação física. **Movimento,** v. 26, e26087, 2021b. Available at: https://seer.ufrgs.br/Movimento/article/view/101307. Access: 15 Nov. 2022.

OSTI, A.; ALMEIDA, L. S. A satisfação acadêmica no contexto do ensino superior brasileiro. **Revista Ibero-Americana de Estudos em Educação**, Araraquara, v. 17, n. 3, p. 1558-1576, 2022. Available at: https://periodicos.fclar.unesp.br/iberoamericana/article/view/16088. Access: 12 Feb. 2023.

PEREIRA FILHO, E. *et al*. Factores que crean una ventaja competitiva: consonancias y diferencias entre gestores y estudiantes de instituciones educativas. **Contaduría y administración,** v. 64, n. 3, e111, 2019. Available at: http://www.cya.unam.mx/index.php/cya/article/view/1581. Access: 12 Feb. 2023.

PEREIRA-NETO, L. L.; FARIA, A. A. G. B. T.; ALMEIDA, L. S. Adaptação e evidências de validação do Questionário de Satisfação com a Experiência Acadêmica Remota (QSEA-R). **Revista Ibero-Americana de Estudos em Educação**, Araraquara, v. 17, n. 4, p. 2626-2647, 2022. Available at: https://periodicos.fclar.unesp.br/iberoamericana/article/view/16756. Access: 12 Feb. 2023.

RECH, G. Z.; PESCADOR, C. M. Ensino remoto em tempos de pandemia:COVID-19 suas implicações na interação professor-estudante - uma perspectiva freireana. **Revista Ibero-Americana de Estudos em Educação,** Araraquara, v. 17, n. esp. 2, p. 1264-1278, jun. 2022. Available at: https://periodicos.fclar.unesp.br/iberoamericana/article/view/16075. Access: 12 Feb. 2023.

SILVA, J. C. *et al*. A relação entre o mix de marketing de serviços, satisfação e lealdade no ensino superior: um estudo de caso de uma IES do terceiro setor. **Revista de Administração, Contabilidade e Economia da Fundace**, v. 9, n. 3, p. 47-63, 2018. Available at: https://www.fundace.org.br/revistaracef/index.php/racef/article/view/523. Access: 12 Feb. 2023.

SILVA, J. R. C. *et al*. A incidência dos mecanismos isomórficos nos processos de autoavaliação institucional. **Navus - Revista de Gestão e Tecnologia**, Florianópolis, v. 9, n. 3, p. 173-186, 2019. Available at: https://navus.sc.senac.br/navus/article/view/903/pdf. Access: 12 Feb. 2023.

SOARES, A. B. *et al*. A Satisfação de Estudantes Universitários com o Curso de Ensino Superior. **Psicologia: Ciência e Profissão**, v. 41, p. 1-12, 2021. Available at: https://www.scielo.br/j/pcp/a/C7Mc5LcL96y5ff3MK8FsX3J/. Access: 12 Feb. 2023.

VIANA, H. B.; RAMOS, M. L.; ROZA, R. H. Estilos de aprendizagem e tecnologias da informação e comunicação no curso de direito. **Revista Ibero-Americana de Estudos em Educação**, Araraquara, v. 16, n. 3, p. 1823-1837, jul./set. 2021. Available at: https://periodicos.fclar.unesp.br/iberoamericana/article/view/13453. Access: 12 Feb. 2023

CRediT Author Statement

Acknowledgements: Not applicable.

Funding: Not applicable.

Conflicts of interest: There are no conflicts of interest.

Ethical approval: Not applicable – secondary data from the Institutional Self-Assessment.

Data and material availability: Not applicable.

Authors' contributions: **Author contributions**: **Celimara Gamba-Lima**: responsible for research planning, theoretical foundation, access to secondary data from institutional evaluation, treatment and statistical analysis of data, interpretation of results and writing of the article; **Denise de Oliveira Alonso**: contributed to the research methodology, treatment and statistical analysis of data, interpretation of results and writing of the article; **Celso Machado Júnior**: supervisor of the work, supported the interpretation of the results and writing of the article.

Processing and editing: Editora Ibero-Americana de Educação.
Review, formatting, standardization, and translation.