

# Scientific methodologic mentoring: experience report in a public health academic subject

*Monitoria de metodologia científica: relato de experiência em um componente curricular de saúde coletiva*

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## ABSTRACT

**Introduction:** Academic monitoring is used as a complementary tool for knowledge construction among higher education students. It works as a mechanism to aid and guide the students, as well as to develop the communication skills beyond the essential knowledge of the monitor. This study aims to report a monitoring experience using different teaching and evaluation strategies through active forms of learning, applying interdisciplinary theoretical and practical activities for medical students.

**Experience report:** This experience report, developed in a public health curricular component of a medical undergraduate course at a federal public university in Rio Grande do Sul, Brazil, presents quantitative data and debates the knowledge acquired through the implementation of education project activities.

**Discussion:** Four semesters were analyzed, comparing records obtained from online forms without identification of the respondents related to the participation of the theoretical and practical monitoring sessions, with a higher participation rate in practical activities (42.31% vs. 25.55%). The main motivations for students looking for monitoring meetings were identified, with explanation of a research simulation stage being the most requested one. Practical monitoring sessions received higher evaluations compared to theoretical ones, considering three aspects: activity importance, clarity and didactics of the monitor, and elucidation of doubts. It was observed a relevant variation in the time assigned to the meetings, with a more frequent duration session of 60 minutes for theoretical activities and 30 minutes for practical activities. The comparison of the proposed practical and theoretical activities implemented through active forms of learning in the monitoring project evidenced the knowledge addition for both students, monitor or monitored, in the teaching-learning process when they are actively engaged in their own education.

**Conclusion:** From the monitor's perspective, there was a strengthening of their own competencies related to scientific knowledge. Furthermore, a leveling of the class was observed regarding the basic content and a gradual progression towards critical thinking among health area students.

**Keywords:** Monitoring; Epidemiologic Methods; Medicine; Public Health; Medical Education

## RESUMO

**Introdução:** A monitoria acadêmica é uma ferramenta complementar à construção do conhecimento dos discentes do ensino superior. Apresenta-se como mecanismo de auxílio e de orientação para os monitorados ao mesmo tempo que desenvolve as habilidades comunicacionais para além dos saberes essenciais do monitor. O presente trabalho tem como objetivo relatar uma experiência de monitoria com diferentes estratégias de ensino e de avaliação por meio de metodologias ativas, aplicando atividades teóricas e práticas interdisciplinares para estudantes de Medicina.

**Relato de experiência:** Este relato de monitoria, realizado em um componente curricular de saúde coletiva da graduação em Medicina de uma universidade pública federal do Rio Grande do Sul, apresenta dados quantitativos e discute os conhecimentos adquiridos com a aplicação das atividades do projeto de ensino.

**Discussão:** Analisaram-se quatro semestres, em que se compararam registros realizados em formulários on-line sem identificação dos respondentes referentes à participação das monitorias de caráter teórico e prático, sendo a maior adesão de participantes nas atividades práticas (42,31% versus 25,55%). Depreenderam-se as principais motivações dos discentes para buscar a monitoria, sendo a elucidação de uma etapa da simulação de pesquisa a mais requisitada. Houve predominância dos valores próximos ao máximo em monitorias práticas em relação às teóricas na avaliação geral delas, sendo considerados três aspectos: importância da atividade; clareza e didática da monitoria; esclarecimento de dúvidas. Percebeu-se que o tempo destinado aos encontros variou de forma considerável, sendo mais frequente destinar 60 minutos às atividades teóricas e 30 minutos às atividades práticas. A comparação da proposta de atividades práticas e teóricas aplicadas por meio de metodologias ativas no projeto de monitoria evidenciou o quanto o discente, monitor ou monitorando, beneficia-se do processo de ensino-aprendizagem quando inserido como responsável principal pela própria educação.

**Conclusão:** Na perspectiva da monitora, houve um fortalecimento das próprias competências relacionadas ao saber científico, assim como se observaram um nivelamento da turma em relação aos conteúdos de base e a progressão gradual da aquisição de um raciocínio crítico do estudante da área da saúde.

**Palavras-chave:** Monitoria; Metodologia Científica; Medicina; Saúde Coletiva; Educação Médica.

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## INTRODUCTION

Academic monitoring acts as a complement to the discipline, providing opportunities for the continuous construction of knowledge by adopting different teaching approaches, allowing the production of new ways of acquiring information<sup>1</sup> through self-directed study. Due to the importance of academic monitoring, since 1968<sup>2</sup>, through the article 41 of Federal Law number 5,540 and later by the Darcy Ribeiro Law<sup>3</sup>, it has been included in higher education, promoting and expanding the knowledge construction network, with the monitor being a facilitator of this process<sup>4</sup>. The monitor is understood as the catalytic figure in the teaching and learning process of the student-teacher binomial. The monitored individual is the student studying the curricular component for whom the monitor's services are intended, receiving support and guidance for better performance.

The monitor benefits from being more exposed to the content being addressed, needing to master it to construct the administered activities<sup>4</sup>. For those being monitored, the advantages are even more evident, since creating a space in which the student can question, practice and review concepts with a lower degree of fear<sup>5</sup> is mainly provided for those who may feel unmotivated to seek out the teacher due to the complexity of the content and the superior knowledge of the topic by this teacher<sup>4</sup>. Thus, the inclusion of monitoring in a medical undergraduate course structured in an active methodology aims to enhance the learning of everyone involved, going against the more passive student profile seen in traditional methodologies<sup>6,7</sup>.

The monitoring, as shown here, arises in the circumstance of student-teacher distancing, both due to the academic context due to non-horizontal relationships, possible causes of discomfort<sup>4</sup>, and due to the scenario of the COVID-19 pandemic, responsible for the physical isolation. For these reasons, strategies were created to mitigate gaps to create a bridge to expand the acquired knowledge<sup>7,8</sup>. During the process of transition from remote to in-person teaching, the implemented technologies, which benefit the education process, remained teaching tools<sup>6</sup>. In this way, one no longer just worked to reduce the student-teacher distancing due to remote classes, but to improve educational assistance on an ongoing basis.

Far beyond the improvement instruments, space was provided to develop other aspects, such as leadership, organization and problem-solving capacity, soft skills<sup>9</sup> that are necessary in the training of contemporary health professionals and limited by the mandatory curriculum<sup>10</sup>. The curricular component of this monitoring vertically integrates technical skills, hard skills, by connecting the mastery of academic

scientific reasoning with clinical application<sup>10</sup>. Justifying the importance of how the findings of academic research guide the clinical conduct of a critical professional<sup>11</sup>.

The monitored person activates a critical and reflective view<sup>12</sup> when creating, implementing, exercising and evaluating actions that move them away from the mechanical transmission of information<sup>12,13</sup>. At the same time, the monitor experiences teaching and creativity skills stimulated by the need to produce materials, organize activities and approach students of the component. Therefore, by going beyond the acquisition of technical knowledge, doctors are trained to become capable of creating an individualized care plan with the best current evidence<sup>10</sup>.

The main objective of this article is to report a monitoring experience in medical graduation, in the public health curricular component, at a public federal university in the state of Rio Grande do Sul (RS), Brazil, with different teaching and assessment strategies through active methodologies, applying interdisciplinary theoretical and practical activities.

## EXPERIENCE REPORT

This is a descriptive experience report, based on the experience of the student monitor, with the purpose of qualitatively and quantitatively discussing the knowledge acquired with the application of monitoring activities in the Public Health III curricular component from June 2021 to February 2023, related to the 2021 and 2022 semesters of medical undergraduate classes. This teaching project was linked to a federal public university in Rio Grande do Sul, the result of a policy of expansion and renewal of federal institutions of higher education<sup>14</sup> with the aim of expanding scientific production in the countryside<sup>3</sup>. This pedagogical service allows the academic monitor to develop teaching mechanisms for better use of the subject by students<sup>5</sup>, having the Academic Development Project (ADP) as an important incentive for scientific construction, a policy to promote internal projects at the institution<sup>15</sup>.

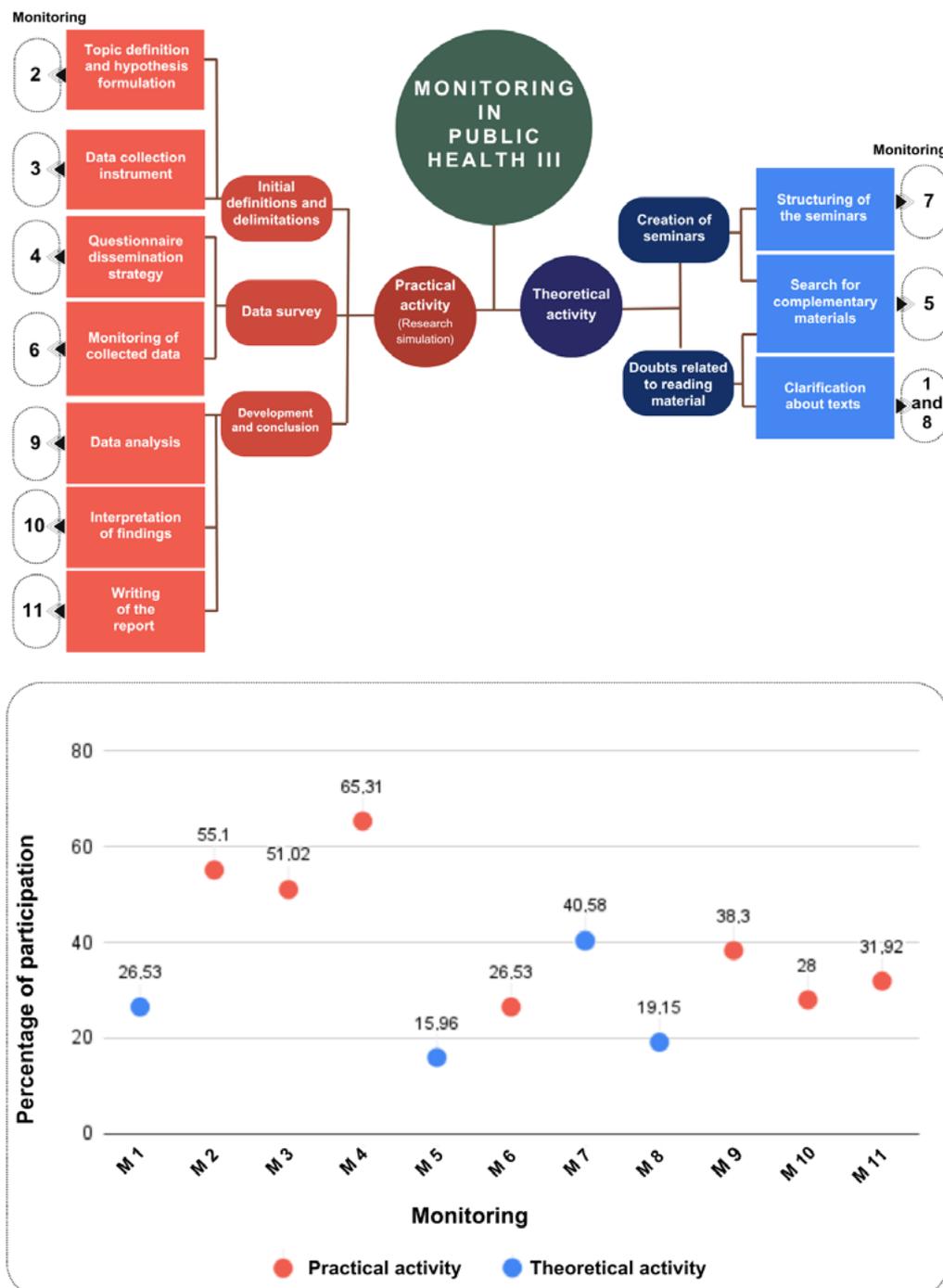
This discipline, taught to students in the third semester, contains a total workload (WL) of 120 hours distributed in 90 hours of theoretical WL and 30 hours of practical WL. The objective is to present quantitative and qualitative research methodologies; demonstrate the importance of epidemiology and biostatistics in analyzing the population's health situation; illustrate the process of demographic transition in recent decades, correlating the impact on the epidemiological profile of these populations with the main health problems; teach the analysis of statistical data and information by articulating biological, psychological, socioeconomic and cultural aspects related to illness; among others. The organization of monitoring was structured with the development of prior planning so it

could dialogue directly with the classes in the teaching plan, proposing the activity format that was the most appropriate for the objective to be achieved.

These monitoring activities were classified into 2 types: theoretical and practical (Figure 1). The theoretical activities addressed the construction of seminars on the health profile of the Brazilian population and questions about the reading material. The practical activities included monitoring related

to the simulation of the research carried out by the small group to which the student was associated. These went through three main moments: initial definitions and delimitations (topic and objectives), data collection and, finally, development and conclusion. Overall, the learning approach varied, sometimes with monitoring for the whole class (discussion of doubts, debates on the recommended academic literature and general reviews) or scheduling of appointments for work

**Figure 1.** Structuring the theoretical and practical monitoring of Public Health III with the respective topic of the one worked in the activity, correlating the percentage adherence of students in the activities in all semesters.



M: monitoring.  
Source: Created by the authors.

groups (4 teams defined at the beginning of the semester that work in the creation of seminars and development of research simulation). Furthermore, the meetings were not mandatory or did not have a direct influence, linked to attendance, on the final grade of the component.

All monitoring common to the 4 aforementioned semesters were grouped, being listed according to the topic (Figure 1). Among those of a theoretical nature, monitoring 1 and 8 provided clarification on texts indicated as the basis of the content; monitoring 5 guided the search for complementary materials and monitoring 7 helped in structuring the seminars. Similarly, when practical monitoring sessions was grouped together, monitoring 2 guided the definition of the topic and formulation of hypotheses; monitoring 3 aimed to construct the data collection instrument; monitoring 4 addressed questionnaire dissemination strategies; monitoring 6 proposed checking the collected data; monitoring 9 aimed to analyze the data; monitoring 10 worked on the interpretation of the findings and, finally, monitoring 11 guided the writing of the final report to be delivered.

For the organization and monitor-student communication, the Google Classroom platform was used to record and as a repository of materials. Only remote (online) meetings were held through the Google Meet platform, using the previously announced schedule. The Canva design platform was used to create review materials and more expository dialogues. The Google Forms platform was used to create organized instruments that were easily accessible to everyone to evaluate monitoring activities. The instrument was organized with objective questions related to the evaluation of the content covered in the monitoring, the monitor's behavior and monitoring in general. The responses were structured on a 9-point Likert Scale (from 1 to 9), with the highest scores being attributed to the most positive evaluations of the parameter.

The evaluation of the activities by the monitor was carried out based on the analysis of the responses to understand the students' experiences and generate feedback to improve future monitoring actions. Thus, falling within item VIII of article 1 of Resolution N. 510, of April 7, 2016, of the National Health Council. The collected information did not contain data that identified the subjects who participated in the activity. They were invited, at the end of the activity, to voluntarily answer the questions sent through the link via Google Meet chat. Moreover, institutional emails and messages sent through the social network WhatsApp were used as more direct and individualized means of communication, both for activity and message reminders and as a space for clarifying doubts.

The Statistical Package for the Social Sciences (SPSS) software was used as a tool for analyzing the data collected in

the component's research simulations and for discussions in practical monitoring. Besides being a teaching tool for those who were monitored, the software also was used to study the findings of this manuscript. The results were analyzed by simple and relative frequency (percentage), and for numerical variables with normal distribution, the mean and standard deviation were presented. The use of statistical tests to demonstrate results aligned with predetermined objectives was not necessary.

In addition to these pre-scheduled meetings, asynchronous monitoring was also offered, in which students had a period to send the produced materials for the monitor to evaluate before the teacher did so. The objective was to assist in the construction of texts and research simulation instruments with assistance aimed at improvements and suggestions for changes to make meetings more efficient. These asynchronous opportunities did not have a monitoring satisfaction assessment, so they were not included in the discussions.

Other than the meetings, the students had access to materials summarizing the explanations, created by the monitor, related to the content worked on in class and applied in the practice of data analysis. Furthermore, in extra activities, they were also stimulated by tutorial videos produced by the teacher to provide guidance related to the resources of the used software. These materials were used for subsequent consultation and studies. All of these mechanisms were structured to re-expose the content in different ways.

## DISCUSSION

Overall, the total number of active students in each semester of the component were 25 students in the 2021/1 semester and 24 students in the 2021/2 semester, 25 in the 2022/1 and 20 in 2022/2. In relation to monitoring, 11 activities common to all semesters analyzed were documented, and these were named according to the covered topic.

When grouping together all the common theoretical monitoring to the 4 discussed semesters, the percentage of participation (Figure 1) of students with the lowest adherence (15.96%) stands out in monitoring 5, for guidance in the search for complementary materials, and the percentage of greater presence (40.58%) stands out in monitoring 7, with the purpose of assisting in structuring the seminars. Likewise, when analyzing common practical monitoring, the highest participation (65.31%) in monitoring 4 stands out, regarding the questionnaire dissemination strategy approach and the lowest adherence (26.53%) stands out in monitoring 6 which proposed monitoring of collected data.

The theoretical monitoring showed an average percentage of 25.55% in relation to participation, significantly lower when compared to those with a practical nature, with

an average percentage of 42.31%. Thus, the greater *quorum* of practical monitoring meets the need of the monitored student for assistance in activities more dependent on the application of knowledge in a process that directly reflects on the final product to be evaluated<sup>16</sup> in spite of activities of a theoretical nature.

Regardless of whether it was practical or theoretical, the monitor's greatest motivation was to contribute to the training of a health professional capable of critically applying the theory presented in scientific research in the context of the population in which they are included. That way, the monitoring format was guided by the fundamentals of the active methodology that the medical degree in this course advocates. The continuity of the teaching-learning process of students who take on the role of instituting their own knowledge and not just receiving information<sup>12</sup> is in line with the reforms in health education discussed for the areas of health professional training as provided for in the National Curricular Guidelines (*Diretrizes Curriculares Nacionais*, DCN)<sup>17</sup>.

The problematization strategy aimed to motivate the student to analyze, reflect and decide on a given situation, showing an active involvement in the training process, provides greater autonomy and more control for the monitored person regarding the acquisition of knowledge<sup>13,18</sup>. Furthermore, the different forms of content presentation offered also intended to consolidate this aspect. Given this fact, the construction of materials aimed to encourage reading as a complementary form of study targeting to increase the frequency of exposure, given that in the component class, cognitive development was prioritized through mainly listening and seeing the content itself<sup>19</sup>.

It is important to point out how offering the activity in a remote format facilitated attendance and development of this pedagogical service. Most of the proposals were based on the analysis of data and information collected in digital records; thus, the sharing of screens to show materials between

monitor and student was facilitated by this format. Initially, this decision, resulting from the need for social distancing due to the pandemic, provided more assistance in the 2021 semesters, but the format remained due to its suitability, adherence and effectiveness. Additionally, two other factors that contributed were the non-commuting to physical academic spaces, eliminating financial expenses, and the more flexible adaptation to students' schedules, by eliminating travel time.

In the development of monitoring demands, the results of the evaluation forms of synchronous moments guided possible changes between semesters, with one of the points for understanding the greatest needs of those monitored being the aspect related to the motivators for adherence to activities. Six aspects were listed (Table 1), with the main ones being: 48.7% elucidation of a stage of the research simulation; 21.7% had doubts about the indicated text; 9.7% wanted guidance in writing the final research simulation report.

The remote meetings between teacher and monitor aimed at changes in the teaching activity, according to the needs of the classes, being based on feedback from those monitored and analysis of the compiled responses from the forms. For example, the doubts presented during monitoring ranged from not fully understanding the guidance provided in class related to the use of tools for data analysis. The frequency with which students questioned the steps of the activities to be completed and which had already been explained repeatedly in class was a recurring point, being the subject of discussion in the monitor-teacher planning<sup>20</sup>. When this deficit was detected, it was first suspected that the communicators (teacher and monitor) had failed, but it was noticed that both repeated the information without considerable message noise, one of the possibilities being the students' lack of attention.

Even though classes and monitoring based on active methodology demand greater participation from students, there is a limit to capturing their attention to activities, regardless of whether they are in-person or remote<sup>21</sup>. For

**Table 1.** Greatest motivations indicated by those monitored for participating in theoretical and practical monitoring of Public Health III in all semesters.

Type of monitoring	Motivators	Frequency	Percentage
Practical	Elucidate a stage of the research simulation	110	48.7
Theoretical	Questions about the indicated text	49	21.7
Practical	Writing the research simulation report	22	9.7
Theoretical	Understanding the teaching material	14	6.2
Practical	Adoption of research tools	11	4.9
Theoretical	More didactic explanation	11	4.9
Theoretical or Practical	Others	8	3.9

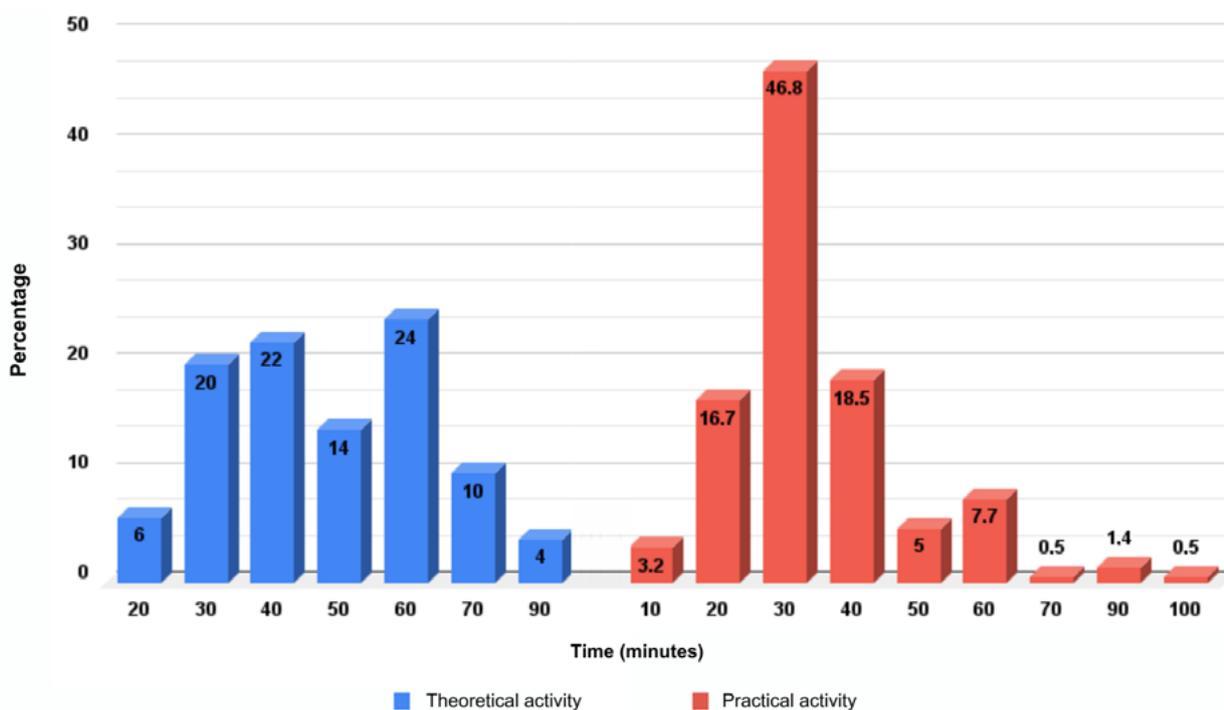
Source: Created by the authors.

this reason, the monitoring adopted shorter sessions, lasting 30 minutes for each work group. It can be observed that the majority of practical activities (46.8%) were carried out within the proposed 30 minutes, with the variation of 10 minutes more or less, covering most of the other proposed practical activities (Gráfico 1). As for theoretical sessions, as they are offered synchronously with the entire class, there is a higher percentage of longer sessions, with those lasting 60 minutes being the most frequent ones (24%).

In relation to the evaluation of each synchronous monitoring activity, those monitored were asked about three points considered crucial for changes in the monitor's conduct: 1. the importance of the activity for learning, 2. the

monitor's clarity and didactics and 3. monitor's collaboration to solve doubts (Table 2). Aiming to understand the relevance of these pillars for the activities, the evaluations obtained were grouped into two large groups. For theoretical monitoring (N = 50), the importance of the activity for learning had an average of 8.82 (SD = 0.56), for the clarity and didactics of the monitor the average was 8.88 (SD = 0.627) and for the monitor's collaboration to solve doubts, the average was 8.88 (SD = 0.627). As for practical monitoring (N = 222), the importance of the activity for learning had an average of 8.89 (SD = 0.422), for the clarity and didactics of the monitor the average was 8.96 (SD = 0.299) and for the monitor's collaboration to solve doubts, the average was 8.93 (SD = 0.397).

**Gráfico 1.** Comparison of the frequency of the duration categories of theoretical and practical monitoring sessions of the Public Health III curricular component in all semesters.



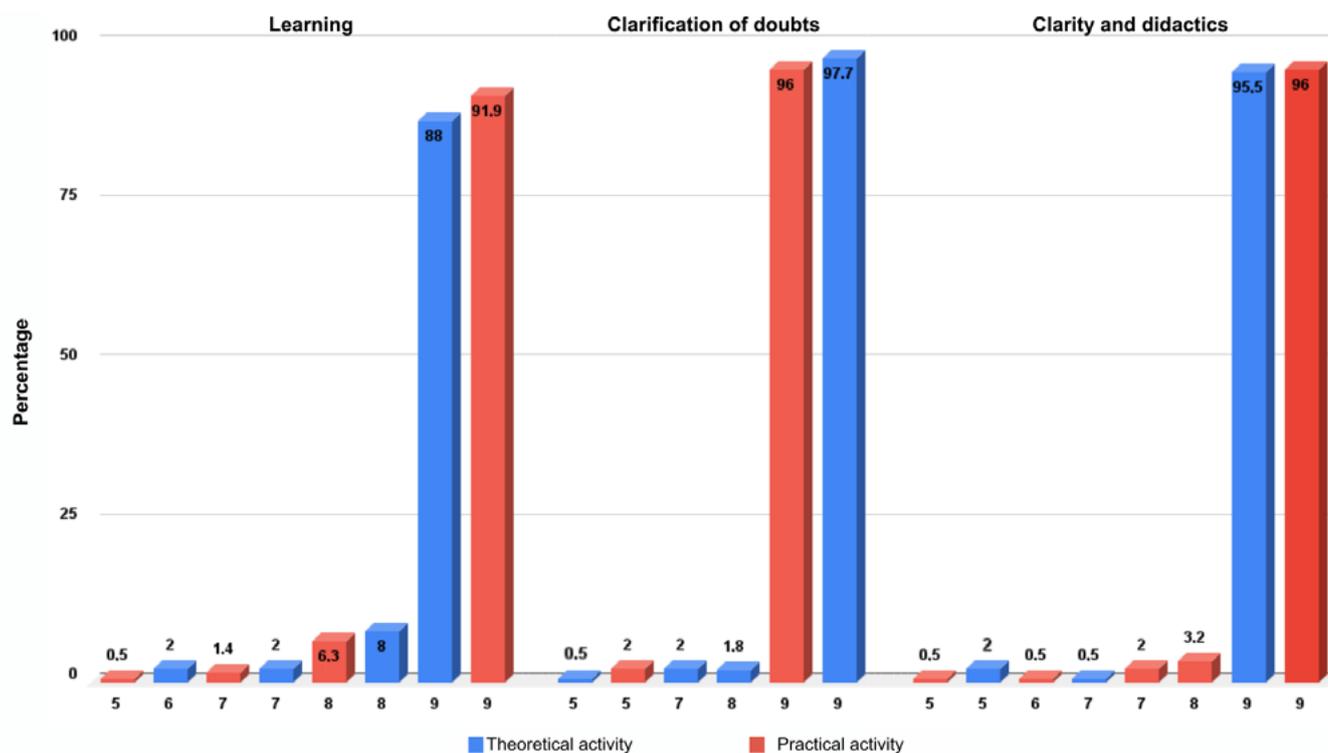
Source: Created by the authors.

**Table 2.** Assessment by those monitored of the general aspects of theoretical and practical monitoring sessions of Public Health III in all semesters.

		Importance of the activity for learning	Clarity and didactics of the monitor	Monitor's collaboration to solve doubts
<b>Theoretical Monitoring</b>	N	50	50	50
	MEAN	8.82	8.88	8.88
	SD	0.56	0.627	0.627
<b>Practical Monitoring</b>	N	222	222	222
	MEAN	8.89	8.96	8.93
	SD	0.422	0.299	0.397

N: sample; SD: Standard Deviation.

Source: Created by the authors.

**Grafic 2.** Assessment of practical and theoretical activities of Public Health III monitoring by those monitored in all semesters.

Source: Created by the authors.

When these evaluations are compared between practical and theoretical activities, it is clear that the satisfaction attributed to the importance of the activity for learning and the clarity and didactic nature of the monitoring are greater in practical activities (Grafic 2). The issue of the monitor's collaboration to clarify doubts was best scored in theoretical activities.

These demonstrations allow us to infer how much the practical aspect proved to be more relevant (Table 1) as demonstrated by the frequency of students in this type of activity (Grafic 1) which received the highest scores in the evaluations (Table 2), highlighting the most relevant aspect, importance and attractiveness for the needs of those monitored (Grafic 2). With the experience of these activities, it was understood how crucial it is to place the student in the center of the scenario of their own learning, as they are the main piece in the construction of their own professional training<sup>22</sup>.

## FINAL CONSIDERATIONS

It was observed, by the monitor, a strengthening of her own skills related to the reasoning behind research production and the aspects of analyzing health information, further consolidating the construction of scientific knowledge. Furthermore, communication skills can be developed by explaining the content, by training management to solve possible complications, by encouraging new personal contacts

with future professional colleagues, which means developing soft skills. It went beyond the undergraduate skills, as significant learning was achieved in the exercise of teaching.

In relation to monitoring, this teaching activity covered both the provision of a tool to develop the class's knowledge regarding these basic contents and the collaboration to stimulate the construction of interdisciplinary knowledge regarding the interface between the areas of epidemiology, biostatistics, research methodology, data analysis and health surveillance. This investment in the gradual progression of the critical development of students in the health field consolidates a generalist, humanist and reflective training in the performance of a future professional capable of using the tools provided by the university to perform a social function based on scientific bases.

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## AUTHORS' CONTRIBUTION

Beatriz Herbst Sanday was a monitor for the Public Health III curricular component, for the semesters of 2021 and 2022, reported in the article. Lucas Pitrez Mocellin was a teacher of the Public Health III curricular component and supervisor of the monitoring of the respective component.

Beatriz Herbst Sanday, Fábio Tavares da Silva and Lucas Pitrez Mocellin actively participated in writing and reviewing all sections of the manuscript.

## CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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