Original article

# Students' perceptions and contributions in the application and evaluation of a medical semiology handbook

# Percepções e contribuições dos estudantes na aplicação e avaliação de um manual de semiologia médica

**Carla Andréa Avelar Pires**[1]
**Satomi Fujihara**[2]
**Glória Calandrini de Amorim**[3]
**Edson Yasojima**[4]
**Jacqueline Caramori**[5]

[1,2-4]Universidade Federal do Pará (Belém). Pará, Brazil.
[3]Corresponding contact. Universidade Federal do Pará (Belém). Pará, Brazil. gloriacamorim@gmail.com
[5]Universidade Estadual Paulista (São Paulo). São Paulo, Brazil.

**ABSTRACT | INTRODUCTION:** The study of medical semiology is essential for medical training. As such, the production of manuals by teachers plays an important role in serving as a theoretical and practical reference, facilitating both teaching and learning. OBJECTIVE: To assess medical students' perceptions regarding the clarity, relevance, and educational potential of a medical semiology handbook developed for the Medical Skills III module of the undergraduate medical program. **METHODS:** This is a descriptive, observational study with a predominantly quantitative approach, complemented by qualitative analysis. The manual was previously validated by 13 expert judges: a professor of Medicine, a professor of Portuguese literature and a teacher. In the present study, validation was carried out by third-semester medical students, using a questionnaire applied to all students in the Medical Skills III module at a federal university in the North of the country. A five-point Likert scale was used to check the degree of agreement between the participants, and Cronbach's coefficient was calculated, achieving excellent internal consistency. **RESULTS:** A total of 93 questionnaires were answered voluntarily. The vast majority of students showed total agreement with the criteria assessed. Some suggestions were incorporated into the manual, such as the inclusion of videos accessible via QR code, with the aim of increasing interactivity and complementing the material's visual resources. **DISCUSSION:** The use of teaching materials with clear and appropriate language favors learning and prepares students for consistent professional growth. These materials have become essential tools for quality medical training. The teacher's role goes beyond the transmission of knowledge, including the creation of resources that meet the specific needs of students. Student participation in the evaluation of the manual highlights the importance of feedback for the construction of more effective teaching resources aligned with the needs of contemporary medical practice. **CONCLUSION:** The participants showed high approval for the manual, demonstrating that teaching materials such as semiology manuals enhance learning and contribute to the training of qualified doctors. In addition, the role of the teacher as a creator of educational resources stands out, which is essential for meeting the needs of students and promoting more dynamic and effective teaching.

**KEYWORDS:** Medical Education. Physical Examination. Educational Materials. Clinical Medicine. Reference Books.

Submitted May 16 2025, Accepted Aug. 15 2025,
Published Oct. 17th, 2025
Inter. J. Educ. Health. Salvador, 2025;9:e6260
https://doi.org/10.17267/2594-7907ijeh.2025.e6260 | ISSN: 2594-7907
Assigned editors: Iêda Aleluia, Ana Cláudia Carneiro

*How to cite this article:* Pires CAA, Fujihara S, Amorim GC, Yasojima E, Caramori J. Students' perceptions and contributions in the application and evaluation of a medical semiology handbook. Inter J Educ Health. 2025;9:e6260. https://doi.org/10.17267/2594-7907ijeh.2025.e6260

**RESUMO | INTRODUÇÃO:** O estudo da semiologia médica é essencial para a formação em medicina. Sendo assim, a produção de manuais por professores desempenha um papel importante ao servir como referência teórica e prática, facilitando tanto o ensino quanto o aprendizado. **OBJETIVO:** Avaliar as percepções dos estudantes de medicina quanto à clareza, pertinência e potencial pedagógico de um manual de semiologia médica elaborado para o módulo de Habilidades Médicas III do curso de graduação em Medicina. **MÉTODOS:** Trata-se de um estudo descritivo, observacional e com abordagem predominantemente quantitativa, complementada por análise qualitativa. O manual foi previamente validado por 13 juízes especialistas: docentes de Medicina, um docente de Letras – Português e uma pedagoga. No presente estudo, a validação foi realizada por estudantes de Medicina do 3º semestre, por meio de um questionário aplicado a todos os estudantes do módulo Habilidades Médicas III de uma universidade federal do Norte do país. Para verificar o grau de concordância entre os participantes foi utilizada a escala Likert de cinco pontos, e o coeficiente de Cronbach foi calculado, indicando excelente consistência interna. **RESULTADOS:** No total, 93 questionários foram respondidos de forma voluntária. A grande maioria dos acadêmicos demonstrou concordância total com os critérios avaliados. Algumas sugestões foram incorporadas ao manual, como a inclusão de vídeos acessíveis via *QR code*, visando aumentar a interatividade e complementar os recursos visuais do material. **DISCUSSÃO:** O uso de materiais didáticos com linguagem clara e apropriada favorece o aprendizado e prepara os discentes para um crescimento profissional consistente. Esses materiais se consolidam como ferramentas essenciais para uma formação médica de qualidade. O papel do professor vai além da transmissão de conhecimento, incluindo a criação de recursos que atendam às necessidades específicas dos alunos. A participação discente na avaliação do manual destaca a importância do *feedback* para a construção de recursos pedagógicos mais eficazes e alinhados às necessidades da prática médica contemporânea. **CONCLUSÕES:** Os participantes demonstraram alta aprovação ao manual, evidenciando que materiais didáticos, como manuais de semiologia, potencializam o aprendizado e contribuem para a formação de médicos capacitados. Além disso, destaca-se o papel do professor como criador de recursos educacionais, essencial para atender às necessidades dos alunos e promover um ensino mais dinâmico e efetivo.

**PALAVRAS-CHAVE:** Educação Médica. Exame Físico. Materiais Educativos. Medicina Clínica. Guias.

## 1. Introduction

The study of medical semiology is crucial in medical training, as it provides the necessary foundation for students to acquire essential skills for diagnosis and the formulation of clinical hypotheses. Semiology acts as a bridge between the basic and clinical cycles in medical school, supporting the development of clinical reasoning and the establishment of the doctor–patient relationship. Through semiology, students learn to conduct anamnesis and perform the physical examination, which are core elements of medical practice[1]. However, although it is central to medical education, the teaching of semiology faces challenges, particularly with regard to the integration of theory and practice and the adaptation of teaching methods to students' needs.

Several studies and pedagogical approaches have sought to address these challenges in teaching medical semiology, but many have failed to provide comprehensive and integrated education. The creation of handbooks by professors is a valuable strategy, as it organizes content in a way that facilitates student learning. Gonçalves[2] emphasizes that the role of the teacher goes beyond the mere transmission of knowledge, also serving as a guide, inspiring and directing students toward the consolidation of clinical and humanistic competencies. Furthermore, educational materials such as handbooks function as tools that facilitate the teaching-learning process, enabling the transfer of knowledge in a practical and engaging way[3]. However, these materials often fall short of their full potential, especially regarding the integration of theoretical and practical aspects of medical education, highlighting the need for continuous validation and improvement.

Pedagogical models should emphasize students' active participation in knowledge construction and content integration, positioning the teacher as a facilitator of this process. Thus, students' views on teaching and their suggestions enable their integration into the educational transformation process, in which they assume a central role in their own learning[4]. Handbooks, as educational technologies, offer an effective approach to autonomous learning, allowing students to continuously review and practice clinical skills. Harden and Crosby[5] stress that

teachers in modern medical education perform multiple roles, not only facilitating learning but also acting as producers and curators of educational materials. In this context, by creating resources such as handbooks, teachers play an essential role in providing materials that support students to develop their skills in an autonomous and practical way. The model of the teacher as a "resource creator" underscores the importance of innovation in the educational context. Teachers who develop their own didactic materials can tailor content to the specific needs of their students, promoting more dynamic and meaningful learning[5].

Given the relevance of handbooks as teaching-learning tools, it is essential to evaluate their effectiveness from the perspective of their primary users: medical students – particularly considering the scarcity of studies in the literature addressing this topic. The analysis of students' perceptions and suggestions provides significant insights for the continuous improvement of educational materials, ensuring that they are aligned with the practical and pedagogical demands of the target audience[6,7]. Moreover, the literature points out that the active involvement of students in evaluating educational resources promotes a more student-centered approach, contributing to the training of more prepared and autonomous physicians[8,9]. This study sought to investigate medical students' opinions on a medical semiology handbook developed and previously validated by expert judges. The handbook was designed specifically for the third-semester Medical Skills module of a medical program, focusing on the physical examination of the precordium, chest, and abdomen, with original illustrations demonstrating specific semiological techniques and maneuvers. It is expected that the results will provide valuable input to improve this material and encourage the creation of other didactic resources, reinforcing the role of the teacher as a facilitator and curator of effective educational tools. Thus, this educational resource is projected to optimize the teaching-learning process and, consequently, contribute to the training of more skilled and prepared professionals for clinical practice.

## 2. Materials and methods

### 2.1 Study design and data collection

This is a descriptive, observational study with a predominantly quantitative approach, complemented by qualitative analysis. The objective was to evaluate the opinion of medical students on the Medical Semiology Handbook, specifically developed for the Medical Skills III module. The manual, previously validated by expert judges using the Content Validation Index (CVI), was presented to the board and the Núcleo Docente Estruturante – NDE (Structured Teaching Nucleus), who disseminated it as a reference for the semester. During its implementation, two teachers from the module contributed to the material's improvement and application.

Data were collected using a semi-structured questionnaire with 15 questions, 14 of which were closed-ended and one open-ended. The closed-ended questions addressed aspects of the manual, such as its objectives, organization, writing style, appearance, and motivation for study, with the following questions: 1. Does the manual meet the class's objectives regarding content learning? 2. Does it favor the understanding of the content of physical examinations of the chest, precordium, and abdomen? 3. Is its use appropriate for a third-semester medical course class? 4. Does the cover have clear indications of the material's content? 5. Are the title and content an appropriate size in the topics? 6. Do the cover, back cover, and table of contents have coherent information? 7. Does the writing style correspond to the knowledge level of the class the material is intended for? 8. Does the text stimulate and arouse interest in reading? 9. Is the text clear, easy, and fluid to read? 10. Are pages or sections appropriately organized? 11. Does the interaction with the material induce interest in the association between theory and practice? 12. Does the manual address content relevant to the basic technique's curriculum component? 13. Does the manual provide the student with the necessary knowledge to develop competencies on the topics in question? 14. Is the number of pages appropriate? 15. Does the manual enable interest in the training of a medical professional, boosting new competencies on the subject?

The manual was delivered at the beginning of the Medical Skills III module, ensuring students had enough time to familiarize themselves with the material. The questionnaire was applied remotely, via the Google Forms platform, during the middle of the module, after students had used the manual in academic learning contexts.

### 2.2 Population and sample

The sample was non-probabilistic, by convenience, consisting of 93 students enrolled in the third semester of the medical course, representing 100% of the students in the module. The population included morning (45) and afternoon (48) students.

### 2.3 Data analysis

The quantitative data from the closed-ended questions were analyzed for relative frequency using Microsoft Excel®. To measure the internal consistency of the questionnaire, Cronbach's alpha (α = 0.87) was calculated, indicating excellent reliability. A five-point Likert scale was used to measure the level of agreement among participants regarding aspects such as clarity, applicability, and motivation. Qualitative responses from the open-ended question were analyzed using the Mentimeter tool, which generated word clouds to identify the terms and themes most mentioned by participants. This qualitative approach highlighted central suggestions and aspects of the manual, providing valuable support for the material's continuous improvement.

**Table 1.** 5-point Likert scale to measure the degree of agreement

| |
|---|
| Totally agree |
| Partially agree |
| Neither agree nor disagree |
| Partially disagree |
| Totally disagree |

Source: the authors (2024).

## 3. Results

A total of 93 questionnaires were sent, and all were answered by the volunteers who agreed to participate in the study. The sample was composed of 52 men (55.91%), equally distributed between the morning and afternoon shifts of a medical school in the North of the country. All participants signed the Free and Informed Consent Form (FICF).

### 3.1 Ethical aspects

The study was conducted in compliance with the ethical principles of the Declaration of Helsinki and the Nuremberg Code, in addition to following Resolution 466/12 of the Conselho Nacional de Saúde (National Health Council). The project was approved by the Comitê de Ética em Pesquisa (Research Ethics Committee) under Opinion No. 7,279,191. The objectives, procedures, risks, and benefits of the research were clarified to all participants, who signed the Informed Consent Form (ICF).

**Table 2.** Semi-structured questionnaire to evaluate students' opinions about a medical semiology handbook

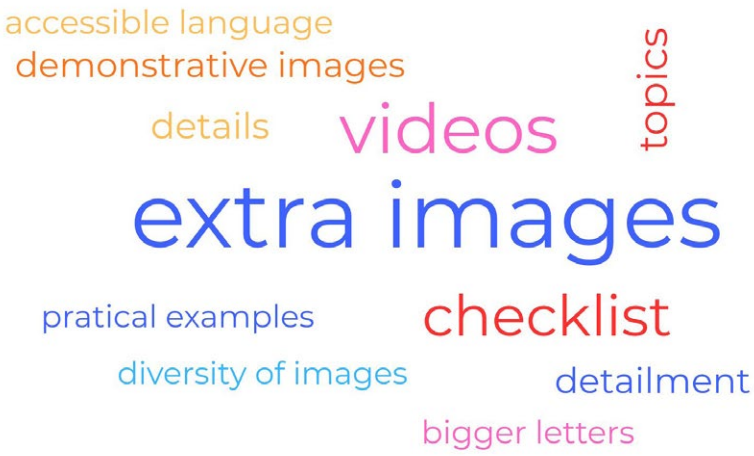
| Evaluation form items | "Totally agree" (%) |
|---|---|
| **Content Objectives** | |
| Does the manual meet the class's objectives regarding content learning? | 85% |
| Does it favor the understanding of the content of physical examinations of the chest, precordium, and abdomen? | 88% |
| Is its use appropriate for the third-semester medical course class? | 89% |
| **Organization and Structure** | |
| Cover with clear indications of the material's content? | 95% |
| Title and content with an appropriate size in the topics? | 90% |
| Do the cover, back cover, and table of contents have coherent information? | 95% |
| **Writing Style** | |
| Does the writing style correspond to the knowledge level of the class the material is intended for? | 95% |
| Does the text provide stimulation and arouse interest in reading? | 83% |
| Accessible and comprehensible vocabulary? | 95% |
| Clear, easy, and fluid to read text? | 91% |
| **Appearance** | |
| Pages or sections: have an appropriate organization? | 95% |
| Do the images help in understanding the content? | 90% |
| **Motivation for Study** | |
| Is the material appropriate for teaching health professionals? | 91% |
| Does the interaction with the material induce interest in the association between theory and practice? | 95% |
| Does the manual provide the student with the necessary knowledge to develop competencies on the topics in question? | 87% |

Source: the authors (2024).

## 3.2 Qualitative analysis

The analysis of the open-ended question, performed through a word cloud, highlighted important themes for the manual's improvement. Suggestions mentioned included the inclusion of extra images, demonstrative images, and greater visual diversity, which facilitated the understanding of complex concepts. The use of larger letters to facilitate reading and the integration of videos to supplement learning were also suggested, expanding the possibilities for interactive teaching adapted to students' demands.

**Figure 1.** Suggestions for improvements according to students' opinions about a medical semiology handbook




Source: the authors (2024).

After validation, the manual was revised, with the incorporation of two explanatory videos of semiological maneuvers, accessible via QR code, and the improvement of the explanation of the Ruault maneuver. These changes were made to meet student suggestions, making the material more complete, interactive, and aligned with the demands of academic and professional practice.

## 4. Discussion

The evaluation of the "Medical Semiology Pocket Handbook" by medical students showed broad acceptance, with praise for its clarity, organization, and practical applicability to teaching. The qualitative analysis, conducted through an open-ended question, brought constructive suggestions that reinforce the manual's potential as an innovative educational tool adapted to student demands.

According to Bloom's proposal, learning objectives and programmatic content address three main dimensions: cognitive, procedural (skills), and affective/attitudinal. In medical semiology, the procedural dimension involves collecting a medical history, performing the physical exam, and documenting findings in the patient's chart[10]. The affective/attitudinal dimension is related to the doctor-patient relationship and the student's insertion into new learning scenarios. In turn, the cognitive dimension requires effective teaching-learning strategies, such as practical classes and teaching materials that present content in a clear and fluid manner, facilitating comprehension and assimilation by academics[10].

In the current context, health area courses face significant changes in their teaching strategies. Active methodology has proven superior to the traditional approach, where students played a passive role, only receiving information from teachers. In this scenario, teaching manuals stand out as learning support tools[11]. Studies, such as that by Higa et al.[12], demonstrate that manuals developed to support learning are widely accepted and recognized as positive resources by medical students, mainly due to their practicality and clarity.

Harden and Crosby[15] highlight that the teacher's role goes beyond the simple transmission of information. These authors propose the "resource creator" model, which emphasizes the relevance of innovation in medical teaching. Teachers who develop teaching materials have a greater ability to adapt content to the specific needs of students, promoting interactive and effective learning. Added to this, Stock et al. reflect on the scientific and social importance of students' contributions to decision-making processes related to medical education[16]. Furthermore, the development of teaching resources stimulates the professional growth of teachers, while also strengthening academic collaboration, creating a more dynamic and enriching educational community[15].

The results of this study suggest that the pocket handbook contributes significantly to the understanding of medical semiology content. Although acceptance was largely positive, about 12% of participants pointed out suggestions for improvement, especially related to learning objectives and the manual's visual presentation. These points reinforce the need to validate materials with the target audience and to make adjustments that can increase their effectiveness and accessibility.

The validation of educational materials is essential to ensure their clarity and relevance to the target audience[13,14]. The validation process allows for the identification of necessary adjustments and ensures that resources meet user expectations. In this study, the structured questionnaire to evaluate the manual addressed aspects such as the material's organization, applicability, and comprehension, strengthening the importance of user involvement in content improvement.

Learning the clinical exam in semiology involves multiple tools, with an emphasis on approaches such as the inverted classroom. Studies, such as that by Patriota et al.[11], show that prior learning followed by later evaluations, typical of this methodology, results in superior performance compared to traditional teaching. This approach reinforces the effectiveness of active teaching, for both theoretical and practical content.

Limitations include considering the sample size; a larger number of participants could strengthen the conclusions; the research being conducted at a specific time in the semester, which may not reflect changes or evolutions in student perception throughout the entire course; the use of questionnaires may limit the depth of responses, as participants may not have the opportunity to provide detailed or contextual feedback. Interviews or focus groups could supplement data collection.

The manual has the potential to transform the teaching-learning process in medical semiology by providing a practical, accessible resource aligned with the contemporary demands of medical education. Its wide acceptance by students reinforces its relevance and effectiveness, and it also serves as an inspiration for the development of new educational technologies by other teachers and students. Thus, the manual promotes a dynamic, innovative academic environment focused on the continuous improvement of medical education.

## 5. Conclusion

This study evaluated the application of a medical semiology handbook for the physical examination of the chest, precordium, and abdomen, and showed that, like other tools described in the literature, such manuals can be used as teaching support instruments, with the potential to improve student learning. Furthermore, based on the analysis of the results, the vast majority of participants approved of the manual provided, confirming the findings in the literature. The suggestions provided by the students were analyzed and accepted, resulting in improvements to the material, such as the inclusion of multimodal resources, which reinforces the collaborative and interactive nature of the teaching-learning process. The essential role of the teacher as a content creator is also highlighted, who, by developing personalized materials, can meet specific pedagogical demands and enhance student learning.


### Acknowledgment

We thank the Programa Institucional de Bolsa de Iniciação Científica (PIBIC)/CNPq for financial support for the research.


### Authors' contributions

The authors declared to have made substantial contributions to the work in terms of the conception or design of the research; the acquisition, analysis, or interpretation of data for the work; and the writing or critical revision of relevant intellectual content. All authors approved the final version to be published and agreed to assume public responsibility for all aspects of the study.

### Competing interest

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

### Indexers

The International Journal of Education and Health is indexed in DOAJ and EBSCO.

## References


1. Santos JB, Pires LL, Silva AE, Castro CN. Reflections on the teaching of basic clinical skills. Rev Bras Educ Med. 2003;27(2):147-52. https://doi.org/10.1590/1981-5271v27.2-010

2. Gonçalves EL. Os objetivos da educação médica. Rev Bras Educ Med. 1998;22(2-3):9-18. https://doi.org/10.1590/1981-5271v22.2-3-002

3. Leite SS, Áfio ACE, Carvalho LV, Silva JM, Almeida PC, Pagliuca LMF. Construction and validation of an educational content validation instrument in health. Rev Bras Enferm. 2018;71(suppl 4):1635-41. https://doi.org/10.1590/0034-7167-2017-0648

4. Silva RMFL, Menezes AMF, Sousa ICC, Oliveira SKS, Batista NB. The teaching of clinical examination from the view of the students: implications for a curricular reform. Rev Bras Educ Med. 2008;32(1):32-9. https://www.scielo.br/j/rbem/a/dJnpyLjFgYcgctnXJJLhNWM/?lang=pt

5. Harden RM, Crosby J. AMEE Guide No 20: The good teacher is more than a lecturer - the twelve roles of the teacher. Med Teach. 2009;22(4):334-47. https://doi.org/10.1080/014215900409429

6. Santos Jr CJ, Misael JR, Silva MR, Gomes VM. Medical education and training in the expanded and multidimensional perspective: considerations about a teaching-learning experience. Rev Bras Educ Med. 2019;43(1):72-9. https://doi.org/10.1590/1981-52712015v43n1RB20180141

7. Marques GAR, Cardoso SDB, Almeida CAPL, Oliveira ADS, Amorim FCM. Evaluation instruments in primary care internships: a bibliographical review. Rev Bras Educ Med. 2024;48:e117. https://doi.org/10.1590/1981-5271v48.4-2023-0175

8. Troncon LEA. Structuring systems for programmatic assessment of medical students. Rev Bras Educ Med. 2016;40(1):30-42. https://doi.org/10.1590/1981-52712015v40n1e01392015

9. Misael JR, Santos Júnior CJ, Wanderley FAC. Academic leagues and medical training: validation of an instrument for student assessment and perception. Rev Bras Educ Med. 2022;46(1). https://doi.org/10.1590/1981-5271v46.1-20210184

10. Midão CMV, Ruiz-Moreno L. Teaching the medical semiology at medical schools in the state of Rio de Janeiro. Rev Bras Educ Med. 2010;34(3):397-405. https://doi.org/10.1590/S0100-55022010000300009

11. Patriota RL, Frias LG, Silton GAFC, Silva MA, Duque TB, Lorena SB. Flipped classroom for learning clinical examination. Rev Bras Educ Med. 2022;46(1):1-10. https://doi.org/10.1590/1981-5271v46.1-20210364

12. Higa EFR, Moreira HM, Pinheiro OL, Tonhom SFR, Carvalho MHR, Braccialli LAD. Caminhos da avaliação da aprendizagem ativa: visão do estudante de medicina. Rev Lusófona Educ. 2018;40(40). https://doi.org/10.24140/issn.1645-7250.rle40.03

13. Nascimento MAR, Andreto LM. Preparation and validation of manual for basic techniques of technical course in nursing. Rev Eletr Acervo Saúde. 2021;13(4):e6871. https://doi.org/10.25248/reas.e6871.2021

14. Streiner DL. Being inconsistent about consistency: when coefficient alpha does and doesn't matter. J Pers Assess. 2003;80(3):217-22. https://doi.org/10.1207/s15327752jpa8003_01

15. Heimerl F, Lohmann S, Lange S, Ertl T. Word Cloud Explorer: text analytics based on word clouds. Proceedings of the 47th Hawaii International Conference on System Sciences; 2014; Waikoloa, HI. https://doi.org/10.1109/HICSS.2014.231

16. Stock FS, Sisson MC, Grosseman S. Students' perceptions of physician-patient relationship learning after curriculum change. Rev Bras Educ Med. 2013;36(1). https://doi.org/10.1590/S0100-55022012000100002