

CAI Synthesis (Classify–Analyse–Interpret): Three Guides for the Analysis of Health History Materials for Educational Purposes

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Abstract

This article introduces the CAI Synthesis (Classify–Analyse–Interpret), a methodological proposal designed to facilitate the critical analysis of historical materials related to health practices, such as artworks, texts, and monuments. Originated in teaching innovation projects of the University of Granada, this tool aims to promote active and interdisciplinary learning in the teaching of the history of health professions. Through a structured approach, the CAI model allows for contextualizing, breaking down, and deeply understanding these historical testimonies, enhancing their educational and heritage value. The article also emphasizes the role of teaching innovation and ICTs in this process, including virtual reality experiences, gamification, and digital analysis. This guide supports a critical and sensitive pedagogy that fosters connections between the past and the contemporary challenges of health care.

Keywords: History of medicine, history of nursing, teaching methodology, teaching innovation, historical analysis, health professions, heritage, ICT, critical thinking.

Introduction

The study of the history of medicine and other health practices is not only based on the analysis of historical sources or the theoretical reconstruction of past knowledge and practices, but also draws on tangible historical materials that have served as witnesses and conveyors of the evolution of thought on health care (Báguena Cervellera et al., 2014; Ruiz-Castell, 2009). Works of art (painting, sculpture, photography, cinema, etc.), historical texts (records, acts, chronicles, regulations, including literary ones), and monuments or buildings related to teaching and healthcare are primary sources that reflect how different societies have conceived health, illness, the human body, and the professional practice of care.

The purpose of this work is to provide students and teachers with an analytical model that allows for the rigorous, in-depth, and critical interpretation of historical testimonies of health practices and professions. Through the methodological proposal we have called CAI Synthesis (Classify–Analyse–Interpret), the aim is to develop a direct relationship with historical materials and reinforce their value as a source of

knowledge and teaching in the history of medicine and other health-related disciplines.

Originally, the CAI Synthesis was conceived as a simple methodological proposal, developed to support the subjects of History of Medicine and History of Nursing, based on experience accumulated through various teaching innovation projects implemented mainly by the Department of History of Science at the University of Granada (Amezcua et al., 2018; 2020; 2023). Drawing from methodologies of iconographic and historical text analysis, its application also extends to locations visited as part of educational itineraries through heritage sites, such as former hospitals, educational centers, and other places of historical and patrimonial value (Amezcua et al., 2023).

The importance of these materials lies in their evocative power, as they enable a visual, textual, or spatial connection with the past. Artistic representations of illness and healing have influenced the social perception of health practices throughout time (Zamudio-Martínez et al., 2019). Historical texts reveal not only the advancement of scientific knowledge but also the scientific and social mindsets that have shaped care practices (Abilio Rabanal et al., 1997). Meanwhile, hospi-

tal buildings and monuments are living structures that, through their architecture and organization, show the evolution of spaces dedicated to health care (López Terrada, 1996).

From a pedagogical standpoint, direct engagement with these materials allows students of the history of health professions to immerse themselves in the real context in which these documents, artworks, or spaces were conceived (Alerm González et al., 2014). In the case of monuments and buildings, observation in natural (non-simulated) environments reinforces the perception of health as a phenomenon embedded in social life, with political, economic, and cultural implications. In this methodological approach, where the teacher acts as a guide, the construction of historical and critical knowledge is encouraged through material evidence (Peset et al., 2001).

Innovative Teaching

The incorporation of innovative pedagogical approaches and the use of information and communication technologies (ICT) are significantly contributing to the learning of history in general and of health professions in particular. Traditionally, these disciplines have been taught through expository models focused on the accumulation of data and chronologies, which has limited their impact on students' critical development. However, new methodologies and digital tools offer the opportunity to transform learning into an interactive, reflective, and applied experience, encouraging critical analysis and active student participation.

Innovative teaching, in its various facets and modalities, promotes student collaboration, interdisciplinary work, and the development of research skills (Martínez Rodríguez et al., 2023; Astraín Gallart et al., 2024). Problem-based learning (PBL), the use of primary sources, historical simulation, and visits to heritage sites are just a few of the strategies that allow students to engage meaningfully with the content.

Moreover, the advancement of ICT has opened up a wide range of possibilities for teaching the history of health care, providing tools that facilitate access to historical documents, enable visualization of heritage spaces, and foster interaction with knowledge.

Among the main applications of ICT in this field are:

Digital archives and databases: Virtual libraries, repositories of manuscripts, and digitized collections have democratized access to historical sources, allowing for deeper analysis of original texts. A notable example is the Spanish archives portal Pares (<http://pares.cultura.gob.es/>).

Augmented and virtual reality: The recreation of historical hospitals or teaching spaces enables students to experience, immersive, the environments in which care practices took place in different eras (Abellaneda Millán, 2024).

Artificial intelligence applied to historical research: Tools such as automated text processing and historical data analysis can facilitate the interpretation of old documents, allowing for

a more agile and systematic approach to understanding the past.

Gamification and interactive learning: Educational platforms, historical simulation games, and interactive apps help students understand the decisions and ethical dilemmas faced by health professionals and caregivers in various historical contexts.

Adopting innovative strategies and technological tools does not imply replacing historical rigor, but rather enhancing the ways in which knowledge is transmitted and experienced. The future of health disciplines depends on our ability to combine academic tradition with the resources that technology offers, ensuring that the history of the professions remains a dynamic, relevant field of study connected to present-day challenges.

Methodological Framework

The analytical model adopted in the CAI Synthesis has been designed as a methodological tool that enables a structured approach to the materials under study, fostering a deep understanding of their significance and relevance in the history of health. This approach seeks to contextualize the objects of study within their historical period (Classification), examine their formal elements and content (Analysis), and extract their meaning in relation to the evolution of thought and health practices (Interpretation).

The analysis and discussion of the monument also extend to the virtual space, where students can upload the materials they have gathered (photographs, videos, field notes) to share with the academic community, using web-based resources to support discussion, synthesize materials, and more. The virtual platform Gomeres thus serves as an aggregation and storage space, enabling exchange and interaction among participants in the project, as well as with other members of the academic and scientific community (Amezcua, 2014).

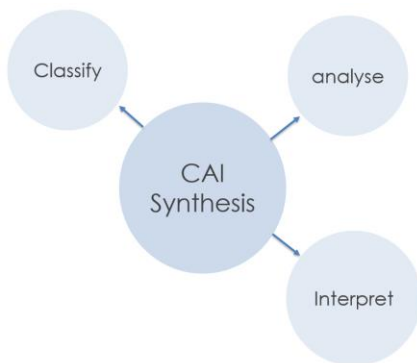
Accordingly, the set of guides we propose has been conceived as an instrument to facilitate rigorous analysis of historical materials in the teaching and learning of the history of health practices. For this purpose, it has been structured into three major sections, corresponding to different types of analysis:

a) *Commentary on works of art.* Works of art have borne witness to and narrated the evolution of all social phenomena (Val Cubero, 2010), including medicine (Aris, 2002). Through painting, sculpture, and other visual expressions, diseases, scientific advances, and care and healing practices have been represented in all their diversity. Analysing them enables a better understanding of how health has been viewed in different eras and its cultural impact (see Table 1).

b) *Analysis of historical texts.* Historical texts provide a direct window into the medical knowledge of each era (Fuente, n.d.). Biographies, treatises, clinical reports, laws, and narra-

tives reflect not only scientific advancements but also prevailing beliefs and healthcare practices. Studying them facilitates understanding of the development of medicine and its transformations over time (see Table 2).

c) *Study of historical monuments and buildings.* Hospitals, sanatoriums, and other buildings dedicated to health practices, including teaching centers, are material testimonies of the history of healthcare (López Terrada, 1996). Their architecture and functionality reveal advances in hygiene, technology, and the organization of care. Analysing them allows us to understand the evolution of health care and its relationship with society (see Table 3).



Each section follows the structure of the CAI Synthesis, grounded in classical models of iconographic analysis (Panofsky, 1995), allowing for an organized and progressive approach to each material:

Classification: The classification of a work, text, or historical building allows it to be situated in its temporal, geograph-

ic, and disciplinary context. Identifying its origin, author, function, and style is key to understanding its purpose and its link to the history of medicine, facilitating its analysis from an academic and heritage perspective.

Analysis: This step examines the formal, structural, and technical elements of the artwork, document, or monument. Its content, composition, and symbolism reveal essential information about healthcare practice, scientific thinking, and perceptions of health in different eras, enabling connections between medicine, art, and society.

Interpretation: This final step delves into the meaning and significance of the object of study within its historical context. Understanding its impact, intentions, and reception helps assess its influence on the evolution of medical knowledge, healthcare practice, and the representation of health and illness over time.

The three guides presented below, conceived with a didactic approach and structured using the CAI Synthesis model (Classify–Analyse–Interpret), are intended to serve as a useful tool to support teaching and learning in the history of health-related disciplines. They aim to facilitate a more active, critical, and sensitive engagement with the testimonies of the past—whether artworks, texts, or heritage spaces—and to awaken in students not only an interest in these disciplines but also a deeper awareness of the historical, cultural, and human dimensions of health practices.

Table 1. CAI Guide for the Commentary of Works of Art

CLASSIFY	<p>Title and author: Identify the name of the artwork and its creator (if known).</p> <p>Chronology: Place the artwork in its temporal context (century, decade, artistic movements).</p> <p>Technique and materials: Is it a painting, sculpture, engraving, illustration, etc.? What materials and techniques were used?</p> <p>Current location: Indicate where the work is currently housed (museum, private collection, part of a publication, etc.).</p> <p>Genre and style: Classify the work within an artistic movement (Realism, Impressionism, Medieval Art, etc.).</p>
ANALYSE	<p>Composition and structure: Describe the distribution of elements in the work (perspective, balance, symmetry, etc.).</p> <p>Use of color and light: What color palette dominates? How does lighting affect the perception of the scene?</p> <p>Figures and depicted elements: Identify characters, objects, and their arrangement. Does the work depict a historical moment or relevant event?</p> <p>Medical symbols and details: Are there instruments, surgical scenes, caregiving actions, professionals or healers? How are illnesses, care, or treatments represented?</p>
INTERPRET	<p>Historical and social context: Relate the artwork to the context of its time. What theories, diseases, or advances were prevalent?</p> <p>Message and function: Does the artwork serve a documentary, propagandistic, educational, or critical purpose?</p> <p>Vision of care: How are medicine and other health arts represented? What vision of science is conveyed? Are other perspectives present: religion, magic, etc.? How are professionals, patients, healers portrayed?</p> <p>Impact and reception: How was it received in its time? What relevance does it hold today for the study of health practices?</p>

Table 2. CAI Guide for the Analysis of Historical Texts

CLASSIFY	Title and author: Identify the name of the text and its author (if known).
	Date and context: Situate the document in its temporal and geographic context.
	Nature of the text: Is it a technical treatise or manual, clinical report, diary, letter, law, literary narrative, religious text, etc.?
	Primary or secondary source: Is it a direct testimony of the period (primary source) or a later interpretation (secondary source)?
ANALYSE	Language and style: What language is it written in? Is its tone scientific, informative, technical, philosophical, or narrative?
	Structure and organization: How is the text divided? Are there chapters, descriptive paragraphs, dialogues, illustrations, etc.?
	Key concepts: What medical or anatomical terms appear? Are specific illnesses, treatments, or care procedures mentioned?
	Perspective and terminology: How are health, illness, and medical practice described? Is the vision empirical, religious, philosophical, or experimental?
	Actors and settings: Who appears in the text? (health professionals, patients, healers, authorities, etc.). Where does the action take place? (hospitals, apothecaries, universities, private homes, monasteries, etc.).
INTERPRET	Sources and references: Does the author cite other professionals or earlier texts? Does it refer to contemporary knowledge (Hippocrates, Galen, Avicenna, Vesalius, Pasteur, etc.)?
	Historical and social context: What was happening in medicine and society when the text was written? Does it respond to scientific, religious, political, or economic needs?
	Author's intention: Does the text aim to teach, inform, document, persuade, justify, critique, or narrate?
	Relationship to contemporary thought: Does it reflect dominant ideas or is it innovative? Does it present new theories or reaffirm existing knowledge? Does it introduce scientific or other types of controversies?
	Impact and legacy: What impact did it have in its time and how has it influenced the history of health? Is it still relevant or merely a historical curiosity?

Table 3. CAI Guide for the Analysis of Historical Monuments and Buildings

CLASSIFY	Name and location: Identify the monument or building and its geographical location.
	Date of construction: Situate the building in its temporal context (century, decade, architectural period).
	Author or sponsor: Who designed or funded the building? (architect, patron, institution, government).
	Original and current function: Was it built as a hospital, spa, sanatorium, or health education facility? Does it still serve that function or has it been repurposed?
	Architectural style: To which movement does it belong? (Gothic, Renaissance, Baroque, Neoclassical, Modernist, Functionalist, etc.).
ANALYSE	Design and structure: How is the space organized? Are there courtyards, rooms, chapels, galleries?
	Materials and construction techniques: What materials were used? Stone, brick, wood, glass, iron? What is predominant?
	Decorative and symbolic elements: Are there inscriptions, sculptures, reliefs, frescoes related to medicine or health?
	Hygiene and functionality: How were issues like ventilation, water access, patient segregation, etc., addressed?
	Architectural innovations: Did it introduce any advances at the time, such as new hospital models, naturally lit operating rooms, drainage systems, etc.?
INTERPRET	Historical and social context: In what medical or sanitary situation was it built? (epidemics, scientific advances, health policies).
	Impact and evolution: How did it influence medicine or healthcare? Was it a model for other similar buildings?
	Relationship with the community: How did it interact with society? Was it a charity center, university hospital, space exclusive to certain social classes?
	State of preservation and legacy: Has it been restored? Is it protected heritage? Does it remain a reference in the history of medicine and health care?

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