

Theoretical frameworks and instruments for evaluation of critical thinking in nursing and education

Referenciais teóricos e instrumentos para avaliação do pensamento crítico na enfermagem e na educação

Referencias teóricas e instrumentos para la evaluación del pensamiento crítico en la enfermería y en la educación

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ABSTRACT

Objective: To identify theoretical frameworks and instruments for the evaluation of critical thinking to base studies in nursing and education.

Method: Integrative review, with a selection of scientific articles in Portuguese, English and Spanish, in the LILACS, SCIELO, IBECs, MEDLINE/PubMed and SCOPUS databases, using the descriptors “thought”, “teaching” and “nursing” in Portuguese and English. The search resulted in 3,147 articles, and 23 papers published between 2010 and 2015 were selected.

Results: Fourteen (60.2%) studies used the Facione framework and eight (34.4%) resorted to different critical thinking assessment tools applied in nursing and education.

Conclusions: Most studies used the Facione framework. Among the evaluation tools, the California Critical Thinking Skills Test (CCTST) and the Watson-Glaser Critical Thinking Appraisal stood out as the most common instruments; both focus on cognitive skills in critical thinking.

Keywords: Thinking teaching. Evaluation. Nursing. Decision-making.

RESUMO

Objetivo: Identificar referenciais teóricos e instrumentos para a avaliação do pensamento crítico a fim de embasar estudos na enfermagem e educação.

Método: Revisão integrativa, com busca de artigos científicos nos idiomas português, inglês e espanhol, nas bases de dados LILACS, SCIELO, IBECs, MEDLINE/PubMed e SCOPUS, utilizando os descritores: “pensamento”, “ensino” e “enfermagem” ou os respectivos termos em inglês. Encontraram-se 3147 artigos; foram selecionados 23 artigos publicados entre 2010 e 2015.

Resultados: 14 (60,2%) estudos analisados utilizaram o referencial de Facione para o embasamento das pesquisas. Identificaram-se 8 (34,4%) estudos utilizando diferentes instrumentos de avaliação do pensamento crítico, aplicados na enfermagem e educação.

Conclusões: A maioria dos estudos analisados utilizou o referencial de Facione. Dos instrumentos de avaliação, houve destaque do California Critical Thinking Skills Test (CCTST) e Watson – Glaser Critical Thinking Appraisal; em relação às habilidades de pensamento crítico, ambos concentram a avaliação nas habilidades cognitivas de pensamento crítico.

Palavras-chave: Pensamento. Ensino. Avaliação. Enfermagem. Tomada de decisões.

RESUMEN

Objetivo: Identificar referencias teóricas e instrumentos para la evaluación del pensamiento crítico a fin de basar estudios en la enfermería y educación.

Método: Revisión integrativa, con búsqueda de artículos científicos en los idiomas portugués, inglés y español, en las bases de datos LILACS, SCIELO, IBECs, MEDLINE/PubMed y SCOPUS, utilizando los descriptores: “pensamiento”, “enseñanza” y “enfermería” sus términos en inglés. Se encontraron 3147 artículos; se seleccionaron 23 artículos publicados entre 2010 y 2015.

Resultados: 14 (60,2%) estudios analizados utilizaron el referencial de Facione para el embasamiento de las investigaciones. Se identificaron 8 (34,4%) estudios utilizando diferentes instrumentos de evaluación del pensamiento crítico, aplicados en la enfermería y educación.

Conclusiones: La mayoría de los estudios analizados utilizó el referencial de Facione. De los instrumentos de evaluación, hubo destaque de las pruebas de rendimiento de las pruebas de California (CCTST) y Watson – Glaser Critical Thinking Rate; en relación a las habilidades de pensamiento crítico, ambos concentran la evaluación en las habilidades cognitivas de pensamiento crítico.

Palabras clave: Pensamiento. Enseñanza. Evaluación. Enfermería. Toma de decisiones.

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■ INTRODUCTION

Critical thinking (CT) is considered a skill to be acquired or improved during the training process of nursing undergraduates. The Brazilian Curriculum Guidelines⁽¹⁾ determine that teaching must be critical, reflexive and creative. The main purpose of this document is to help train nurses so they can act in the health settings in which they are inserted to offer health care.

However, guidance to reach this goal is limited and the lack of clarity and consensus about the development of this behavioral model to think critically is still a gap in the nursing knowledge. In addition, there are several terminologies used as a synonym for critical thinking, such as creative thinking, reflexive thinking, clinical reasoning and diagnostic reasoning. Usually, CT stands out as a skill in healthcare professionals, especially in nursing⁽²⁾.

Critical thinking is essential for decision making in nursing, mainly in the application of the nursing diagnostic process with accuracy and reliability. It contributes to developing safe, resolute and well-structured nursing practices to achieve results⁽³⁾. In this context, it is important to consider the CT structural elements regarding mental habits: trust, contextual perspective, creativity, flexibility, curiosity, intellectual integrity, intuition, understanding, perseverance, and reflection. Such habits collaborate on the practice of behavioral and cognitive analysis skills, application of standards, discernment, search for information, logical reasoning, prediction, and knowledge transformation⁽³⁾. An integrative review by Brunt⁽⁴⁾ covering the period between 1992 and 2003 aimed to identify the definitions of CT and described the investigations related to the subject in that time interval.

A similar review that focused on the period between 1981 to 2002 was published in 2005⁽⁵⁾. It involved the selection of studies in the National Library of Medicine (PubMed), Electronic Journals Service (EBSCO) and Cumulative Index to Nursing and Allied Health Literature (CINAHL) databases and addressed the topic concept analysis of critical thinking in the nursing field. These publications evidenced several definitions of CT; nevertheless, the theoretical frameworks were not the focus of these investigations, which motivated and justified the present study.

In the firstly mentioned review, half selected papers did not present a clear definition for application of CT, even using the frameworks of the classic studies by Richard Paul, Scheffer and Rubenfeld, and Alfaro Lefreve⁽⁴⁾. An integrative review was published in 2014 addressing CT theoretical frameworks in nursing and instruments for its evaluation in the *Revista Iberoamericana de Educación e*

Investigación en Enfermería covering the period between 2005 to 2011⁽⁶⁾.

The objective of the present study was to identify theoretical frameworks and instruments to evaluate CT to base studies in nursing and health care.

■ METHODS

The present study was structured as an integrative literature review and followed five steps: problem formulation, data collection, data evaluation, data analysis, and interpretation and presentation of results⁽⁷⁾. The guiding questions were: What are the theoretical frameworks used to base studies related to CT in nursing and health care?; and What are the most common instruments to evaluate CT?

The time gap encompassed in the present review was 2010 to 2015. This choice took into account that there are other reviews on this subject covering previous years. The descriptors used in the search were “thinking”, “teaching”, and “nursing”, in Portuguese and English, included in the Health Sciences Descriptors (DeCS) and the Medical Subject Headings (MeSH). The consulted databases were the National Library of Medicine (MEDLINE/PubMed), the Latin American and Caribbean Center on Health Sciences Information (LILACS), the Scientific Electronic Library Online (SciELO), Scopus, and the *Índice Bibliográfico Español de Ciencias de la Salud* (IBECS). These descriptors were chosen due to their close relationship to the theme.

Inclusion criteria for paper selection were publications in English, Portuguese or Spanish, whose objective of the study was strongly related to CT, and materials available as full texts. Exclusion criteria were studies that did not address the subject under investigation, theses, dissertations, book chapters, and editorials.

First, the titles of the publications were read and the abstracts were examined to check if the inclusion criteria were met. In the cases in which the title and abstract were not enough to define the subject of the paper, the full text was searched and read.

The final sample was obtained after the analysis of the preselected papers. In the MEDLINE/PubMed database, 127 studies were found. After a careful analysis, only four papers were selected. In the case of LILACS, 79 publications were preselected and seven were included in the final sample. SciELO provided 236 studies, of which 13 remained in the sample. Nevertheless, eight papers had already been identified in other databases, and the final contribution of SciELO was reduced to five studies. The search in Scopus revealed 675 papers and six were selected. For IBECS, a preselection of 24 publications preceded the choice of two papers.

The total number of papers found in all databases was 3,147. Application of inclusion and exclusion criteria and

examination of full texts resulted in a final sample of 23 publications, as shown in Figure 1.

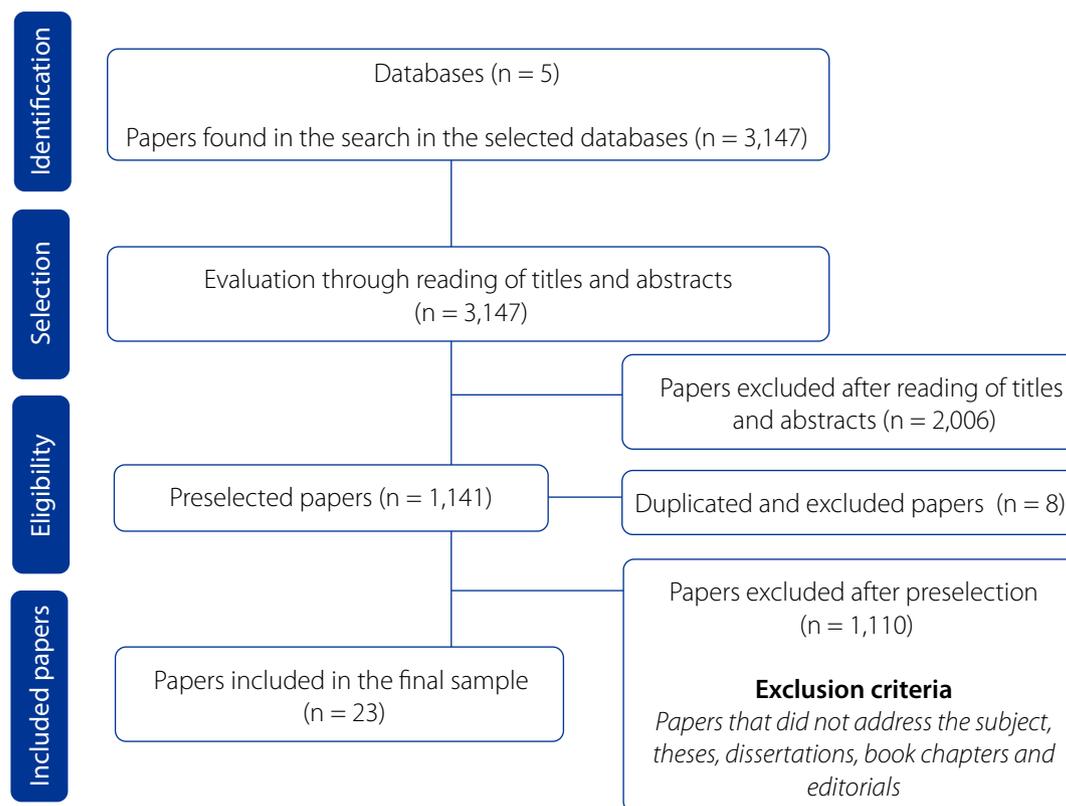


Figure 1 – Flowchart of the paper selection process, which was carried out in the MEDLINE/PubMed, LILACS, SciELO, Scopus and IBECs databases and covered research developed between 2010 and 2015.

Source: The authors.

Ethical requirements regarding the scientific publications used in the present study were met, with the proper citation of the authors⁽⁶⁾.

■ RESULTS

Characteristics of the publications

The selected studies were published between 2010 and 2015, and 2014 was the year with the highest number of papers, with 10 (43%) studies, followed by 2012, with 5 (21.5%), and 2010, with 4 (17.2%). National journals published 5 (21.5%) papers; *Revista Gaúcha de Enfermagem* and *Revista Latino Americana de Enfermagem* stood out as the most frequent. International journals concentrated most selected studies – 18 or 77.6% – and the journal *Nurse Education Today* issued 3 (12.9%) publications. As for the place of origin of the Brazilian studies, most of the materials was developed in the South and Southeast regions of Brazil.

The predominant type of study in the sample was the descriptive-exploratory, with 7 (30.1%) papers, followed by methodological studies, with 3 (12.9%) publications, a characteristic related to the focus of a significant percentage of the selected material on translating and adapting the CT evaluation tools transculturally. In addition, integrative reviews were recurrent, with 3 (12.9%) publications, as well as bibliographic and systematic reviews, with 2 (8.6%) studies. The remaining publications focused on the Delphi technique, descriptive-observational reflections, and longitudinal surveys. The most used analysis methods to interpret data were descriptive and qualitative analysis, employed in 8 (34.4%) papers, and content analysis, resorted to in 6 (25.8%) studies.

Theoretical frameworks and definitions of Critical Thinking

This analysis category presents the main definitions found in the sample of the present investigation. Facione's

frameworks based most studies. Analysis of the international papers allowed the identification of the most cited authors that guided the theoretical frameworks of these publications: Facione^(2-3,9-21), Ennis^(2-3,11,13,19,22), Scheffer and Rubenfeld^(3,20,23-24), Paul, Elder and Bartell^(19-20,25-26), and Alfaro-Lefevre^(9,27-28).

Critical thinking is considered a fundamental component in professional responsibility and care quality in nursing^(3,14,20,23-24). It is also construed as an essential element of the nursing process; it must follow standards, policies, and codes of ethics in problem solving, and involve logic, intuition and creativity, crucial characteristics that are enhanced by specific knowledge and clinical practice. In addition, it focuses on safety and quality by prioritizing the needs of patients, families, and communities^(9,27-28). In this sense, CT would not be a method to be learned, but a process, an orientation of the mind that incorporates emotional and cognitive domains^(2-3,9,11,13,19,27-29).

Critical thinking is described as a nurse's basic skill to organize the nursing process and solve patients' problems, contributing to a safe and effective care in different clinical settings^(2-3,9-21). It is a fundamental tool to face successfully the complexity of modern life, which is scientifically and technologically^(20,30). In the contemporary society, in which knowledge increases quickly, CT is an indispensable tool to achieve success⁽¹¹⁾.

These features cause CT to be multidimensional, encompassing intellectual (logic, rationality), psychological (self-awareness, empathy), sociological (historical-social context), ethical (moral rules and evaluation) and philosophical (meaning of human nature and life) dimensions^(25,19-20,26,31). In addition to these characteristics, CT is defined as the rational and reflexive thinking, centered at the decision of what to believe in or do^(13,22,31-33), the intentional judgment that results in interpretation, analysis, evaluation and inference, as well as the explanation of the evidence on which a decision was based^(2-3,9-20,34).

Critical thinking is considered a reflexive thinking that evaluates statements correctly and focuses on the decision of what to believe in^(3,16,31,35). The capacity to question and answer questions that require skills to analyze, summarize and evaluate information can also be included in the CT concept⁽³⁻¹⁶⁻³⁶⁾.

Instruments to measure Critical Thinking

The evaluation of CT occurs through the application of instruments and strategies created specifically for this purpose, observation of environments where the nursing practice is developed, methodologies to solve proble-

ms using clinical cases, analysis of portfolios and concept maps. Some authors recommend evaluating CT using more than one strategy and advocate that the assessment be carried out in different moments. Ennis states that it is possible to find two types of evaluation tools: the ones that address more than one CT skill and the ones oriented to a single CT competency^(2-3,9,11,13,19,27-29,31).

The most cited instruments to evaluate CT in the present review were the Watson-Glaser Critical Thinking Appraisal^(2,14,16,37), the California Critical Thinking Skills Test^(2,14,18,21,31), the Ennis Weir Critical Thinking Essay Test^(2,28,36), the Cornell Critical Thinking Test^(2,14,29), the California Critical Thinking Disposition Inventory^(2,17,21,31), *Prova de Pensamento Crítico* by Santiuste Bermejo, Ayala, Barriguete, Garcia, González, Rossignoli and Toledo⁽³⁸⁾, the Pencilal Critical Thinking Test⁽¹³⁾ and Real-world Outcomes⁽¹¹⁾. These tools are described in Chart 1.

Analysis of Chart 1 shows that cognitive and behavioral skills and mind habits are not uniformly distributed among the listed instruments. Only two tools present dimensions related to these three spheres, the California Critical Thinking Disposition Inventory (CCTDI)^(2,17,21,31) and the Cornell Critical Thinking Test^(2,14,22).

The other instruments emphasize cognitive skills, with little or no reference to dimensions referring to behavioral skills and mind habits. The latter aspect is the less evidenced, being present in three out of eight instruments. Despite the unbalanced emphasis on the three CT dimensions, it is undeniable that such tools provide decisive results and have applications in many areas of knowledge; however, they are still little explored in nursing, which suggests the need to use them with nurses and nursing undergraduates^(2,17,21).

The present study revealed high-quality instruments that can be explored in the nursing field in Portuguese-speaking countries, such as Brazil. An example is the *Prova de Pensamento Crítico* by Santiuste Bermejo, Ayala, Barriguete, Garcia, González, Rossignoli and Toledo, which evaluates substantive dimensions that encompass the actions developed to explain reasons and elements of proof that support a point of view, as well as the dialogical dimension of people, oriented to the analysis of integration of different standpoints or a contrast with the correct perspective⁽³⁸⁾.

Another instrument mentioned in the examined studies was the Pencilal Critical Thinking Test, developed and validated with a Spanish-speaking population. This tool consists of 35 items that address a daily problem situation and has open-ended questions involving different areas, with a single answer. This instrument assesses the funda-

mental thinking skills and the most relevant reflection and problem-solving strategies in daily activities. It was applied at the Pontifical Catholic University in Peru, with 422 Scien-

ce and Engineering undergraduates. This test fulfills the psychometric requirements to be used in CT skills evaluation in the Peruvian population⁽¹³⁾.

CT evaluation tool	CT dimensions		
	Cognitive skills	Behavioral skills	Mind habits
California Critical Thinking Skills Test (CCTST) ^(2,14,18,21,31)	Analysis/interpretation/self-regulation/inference/explanation/evaluation	Analysis	
California Critical Thinking Disposition Inventory (CCTDI) ^(2,17,21,31)	Analytical spirit/cognitive maturity	Widening of thinking/analytical spirit/systematization/self-confidence in CT	Curiosity/search for the truth
Watson-Glaser Critical Thinking Appraisal ^(2,14,16,37)	Inference/deduction/interpretation/argument evaluation		Supposition
Ennis Weir Critical Thinking Essay Test ^(2,28,36)	Ability to reply arguments, providing a written critical answer to a specific real-life question		
Cornell Critical Thinking Test ^(2,14,22)	Induction/deduction	Credibility	Identification of suppositions
Prova de Pensamento Crítico by Santiuste Bermejo, Ayala, Barriguete, Garcia, González, Rossignoli and Toledo ⁽³⁸⁾	Substantive dimension	Dialogic dimension	
Penrcisal Critical Thinking Test ⁽¹³⁾	Deductive reasoning/inductive reasoning/practical reasoning/decision making	Problem solving	
Real-world Outcomes ⁽¹¹⁾		Behaviors/attitudes	

Chart 1 – Relationships between CT skills and dimensions in the CT evaluation tools.

Source: The authors.

The Real-World Outcomes inventory assesses daily troublesome behaviors and shows decisions in which CT is presumed to be absent by evaluating negative results of poor daily decision making. It also allows inferring the level of CT that pervades the reasoning applied to daily issues. The study was carried out in Portugal and was translated and adapted to Portuguese. The outcomes evidence the relevance of the instrument to evaluate decision making and its impact on people's lives and to estimate the quality of the CT used in daily situations⁽¹¹⁾.

■ DISCUSSION

The present review illustrates the diversity of CT theoretical frameworks in literature. The most cited were those proposed by Facione^(2-3,9-21), Ennis^(2-3,11,13,19,22), and Scheffer

and Rubenfeld^(3,14,20,22-24). A comparison of the published material showing different definitions of CT and covering distinct periods indicates that the most recent studies have been innovative for including a higher number of authors that address this definition.

Nevertheless, the frameworks that stood out in the present study were the classic ones: the paper by Facione, with its Delphi study at the American Philosophical Association; the publication by Schaffer and Rubenfeld, who reported a Delphi study in which they described an international panel of nurses from nine countries and 23 American states to achieve a consensus about CT in nursing; the publication by Richard Paul, president of the National Council for Excellence in Critical Thinking; and the definition by Alvaro Lefevre, centered on the development of CT, contributing decisively to nursing teaching

and training, mainly in application in the nursing diagnostic process^(18,22,26,31,33).

The study carried out in China brings to the discussion the fact that different cultures influence the way people think. China has a political-ideological context based on authoritarianism and control, which could hinder CT in the Chinese population. Before thinking critically, it is fundamental to work on people's critical formation⁽¹⁶⁾. This attitude can be an important contribution to countries in the Middle East, Africa, Europe, and Asia if nursing training is considered worldwide.

Another study, developed in Iran and based on a concept analysis focused on the perspective of nursing undergraduate students and professors, emphasizes the importance of CT to constitute an independent subject in the nursing curriculum and health care in general. It also suggests that this topic can be addressed in the nursing philosophy subject, given the relevance of the theme to the professional performance⁽²⁷⁾.

Some experts defend the idea that CT must pervade the contents in the subjects in the curriculum of several areas of knowledge, especially the ones related to health care. This is a fundamental attitude, considering that an assertive criticality, allied to thinking, denotes quality and safety in the care delivered to patients. Thinking critically assumes mental habits and skills that can be developed and it is important to introduce this practice in different levels of healthcare training.

This discussion stresses the need to design theoretical models to evaluate CT in undergraduates and professionals to enable them to think critically, so they can change their practices in different care levels. A way to achieve that is to include in the theoretical frameworks instruments to assess CT with a holistic approach. If applied correctly, this strategy can help disrupt the standards in linear thinking.

It is necessary to train professors for the practice of evaluating CT in undergraduates and developing this type of thinking by using validated strategies. The different tools analyzed in the present review can be applied in the training process of future nurses and other healthcare professionals.

As a challenge and innovation proposal, the authors would like to emphasize the need to break up the biomedical paradigm using clinical evidence to support new ideas, developing a care practice in which nurses can think holistically. This context urges the challenge to teach to think, not just logically and linearly, but also considering a widened, dynamic, sensitive, understandable, human, intuitive thinking, with an emphasis on mental habits. This new approach encompasses all human dimensions involved in care.

The framework by Facione, the most cited author in the selected publications, brings the definition of holistic critical thinking (HCT) as thinking with quality, that is, a process of judgement centered on deciding what to believe in or do; to achieve it, the thinker must not be negative or cynical, but thoughtful or reflexive and equilibrated, requiring people to express some kind of reasoning or basis for what they say⁽³⁹⁻⁴⁰⁾.

Before this, the authors stress the need to develop new studies using instruments to evaluate CT to identify how people think and the quality of their thinking. Having this information will make it possible to design strategies to model thinking with criticality. It is also important to emphasize the instrument Holistic Critical Thinking Score Rubric (HCTSR), developed by Facione and translated and transculturally adapted to the Brazilian reality by Riegel and Crossetti. This tool was not found in the sample of the present review but can fill some gaps between logical and holistic thinking and assess it. By doing that, this instrument helps validate a judicious judgment, supported by well developed and structured mind habits, with an emphasis on the comprehensiveness of patients⁽³⁹⁾.

■ CONCLUSION

The present review brought up several definitions for critical thinking. However, there was a predominance of theoretical frameworks that can be used as a basis for the elaboration of research in the field of criticality on thinking in several activities in health care and nursing education. The recurrence of studies that mentioned the instrument developed by Facione, especially in the international literature, can be related to its efficacy and positive results. Despite this predominance, other tools have been developed and applied in many countries to achieve a reliable and assertive evaluation, taking into account all the dimensions that constitute thinking.

In this aspect, this topic has been a reason for concern among researchers and continues to be an important object of study. This can be explained by the fact that CT has become essential in training and work environments, widening the horizons of reflection and boosting decisions grounded on knowledge and organized with high-quality, well-defined and coherent thinking.

This literature review sets off a discussion about the variety and number of theoretical frameworks and instruments to measure CT, which contributes significantly to training in the nursing field and helps future professionals to learn how to think and do it with quality. It is intended that they become critical, reflexive, ethical, capable of

making the best decisions in the nursing diagnostic process, committed to the health of the Brazilian population and ready to face the challenges posed in our society.

The main limitation of the present review was the use of a reduced number of databases. Important directories such as Web of Science, CINAHL, and Embase were not consulted. In addition, there may have been a significant diversity in the perspective of the authors regarding the variables examined in previous integrative reviews, given that the method has a subjective component in data analysis and interpretation and, consequently, in results.

The outcomes stress the importance to design theoretical models to guide the evaluation of thinking to change it. It is fundamental to establish a strongly structured teaching system, with active learning methodologies and a focus on accurate decision making regarding professional healthcare training on CT. The authors suggest teaching and evaluating CT holistically, using the instrument Holistic Critical Thinking Scoring Rubric (HCTSR), proposed by Facione, to bring innovation to the learning process and accuracy to the application in the nursing diagnostic process.

Professionals that work on nursing training must not lose sight of the importance to identify the level of thinking and the skills that have to be qualified or developed, a task that can be accomplished with the application of the instruments available in the literature. This assessment must be the starting point to the necessary interventions to improve CT. It is crucial to innovate and include new technologies in teaching methods to develop the thinking of the professionals that will assist the population in healthcare services so that patients can be understood and assisted as the holistic beings they are.

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