

**E-BOOK**

# TEACHING BASED ON CHINICAL REASONING

A stylized illustration of a human head in profile, facing left. The brain is rendered in a reddish-pink color with a glossy, anatomical texture. The skull and facial structure are shown in a translucent blue, wireframe-like style. The background is a gradient of blue and purple.

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**MESTRADO  
PROFISSIONAL  
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DA SAÚDE E DO MEIO AMBIENTE**

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# TEACHING BASED ON CLINICAL REASONING

MASTER'S PRODUCT



PROFESSIONAL MASTER'S IN EDUCATION IN  
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# SUMMARY

## PART 1- CONCEPT AND STAGES OF CLINICAL REASONING

CLINICAL REASONING: WHAT IS IT? .....	5
STAGES OF THE CLINICAL REASONING: HOW DOES IT? .....	7
DATA: 1ST STEP .....	8
HYPOTHESES: 2RD STEP .....	10
HYPOTHESIS TESTS: 3RD STEP .....	12
RESULTS: 4 RD SETP .....	13
DIAGNOSTIC PROOF: 5RD STEP .....	14
THERAPEUTIC PLAN:6RD STEP .....	16

## PART 2: INTERVENING FACTORS, ANALYTICAL AND NON-ANALYTICAL SYSTEM, DECISION MAKING AND HEURISTICS

INTERVENING FACTORS .....	18
ANALYTICAL AND NON-ANALYTICAL SYSTEM .....	21
DECISION MAKING AND HEURISTICS .....	23

## PART 3 : PERSONAL REQUIREMENT AND COGNITIVE PROCESS

PERSONAL REQUIREMENT .....	28
COGNITIVE PROCESS .....	29

## PARTE 4 - CYCLE OF TEACHING AND STUDENT ATTRIBUTES

CYCLE OF ATTRIBUTES: TEACHERS X STUDENT .....	32
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## PARTE 5- ALBERT BANDURA'S SOCIAL COGNITIVE THEORY

EDUCATIONAL ACTION INSTRUMENT: .....	38
ALBERT BANDURA'S SOCIAL COGNITIVE THEORY	
CAPABILITIES THAT GOVERN LEARNING AND PERFORMANCE .....	43
COGNITIVE SOCIAL THEORY AND TEACHING-LEARNING .....	46
FINAL CONSIDERATIONS .....	50
REFERENCES .....	52



## PRESENTATION

This manual was developed as a product of the Professional Master's Degree in Teaching in Health Sciences and the Environment at the University Center of Volta Redonda - UniFOA as an adjunct to the work of teaching and inducing Clinical Reasoning professor in Medicine graduation.

Clinical Reasoning is a complex mental operation that involves sequential steps that culminate in clinical decision points (diagnostic or therapeutic) steps.

Often pointed out as a key piece in the arsenal of skills to be acquired, Clinical Reasoning needs teaching activities specifically aimed at its learning and that have intentionality and design aimed at its induction, fixation and adequate development.

The explanations contained in this material are designed to support the development of clinical competences that contribute to a culture of quality, safety and efficiency of care firmly based on the integration of theory and practice.

In this context, it is expected that the information contained in this work can resolve doubts on the subject and facilitate the process of teacher mediation to achieve an adequate and relevant development of the Clinical Reasoning process, facilitating the development of this competence in students.



**PART 1**

**CONCEPT AND  
STAGES OF CLINICAL  
REASONING**

## CLINICAL REASONING: WHAT IS IT?

The educational system is seen as of fundamental importance in preparing students for professional performance. Researchers point out that theory and practice of the clinical reasoning process present difficulties both in its understanding and in its application. While experienced professionals use it automatically and routinely, which ends up resulting in an almost unconscious exercise of a specialized and directed reasoning process, students and newly graduated professionals require attention, mental effort and time to organize and analyze the reasoning process. Clinical (BALDUINO et al., 2012); (AMORIM, 2013).

To Aragão; Almeida (2017, p. 1)

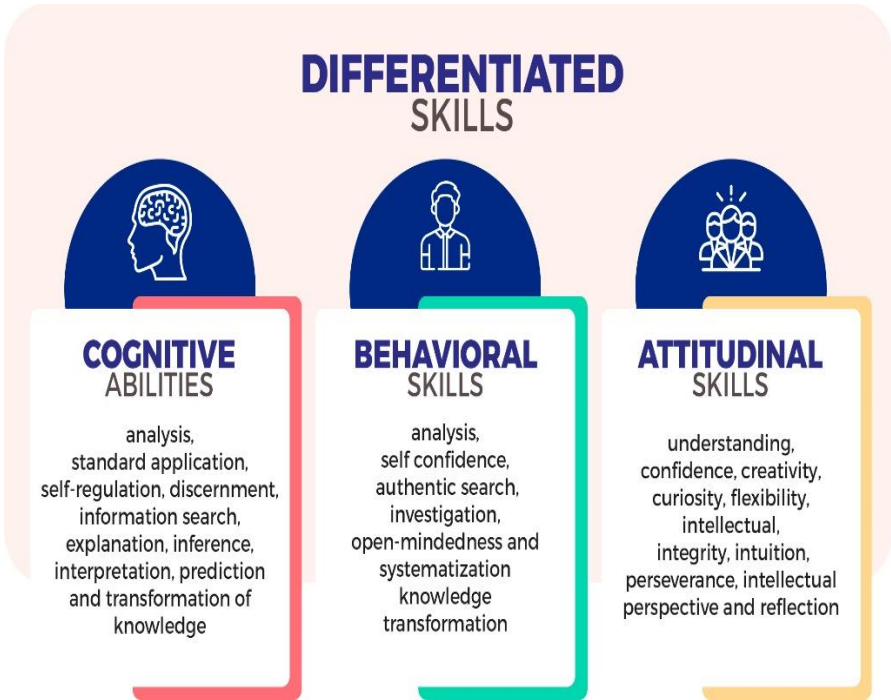
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Clinical reasoning is understood as the ability of a physician (or professional) to interpret data, formulate diagnostic hypotheses and, after testing and proving them, propose conducts and therapies that contribute to the well-being of the patient.

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Theoretically, Clinical Reasoning is a complex concept to explain and involves a set of learned skills and necessary attitudes that can be divided into three categories:

**TABLE 1- DIFFERENTIATED SKILLS**



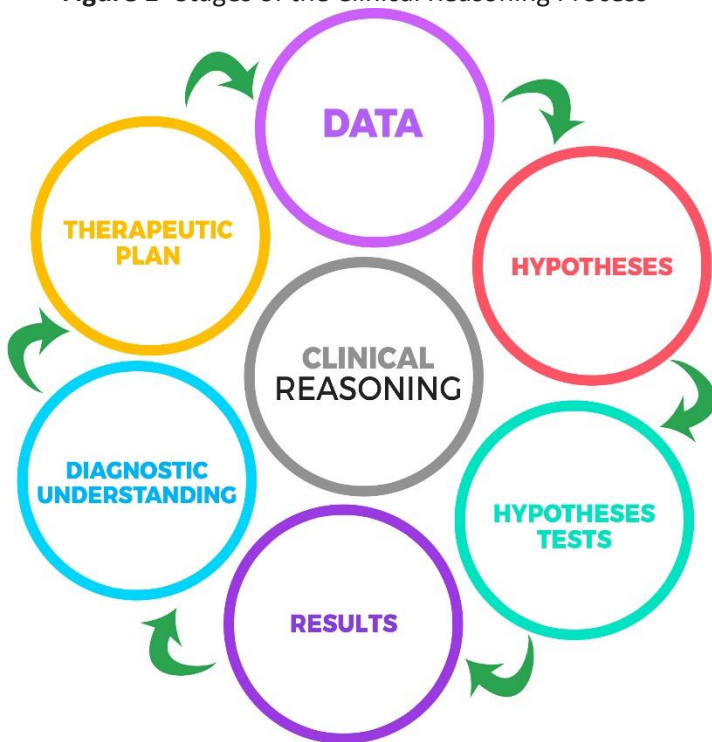
Font: (CORREA, 2003);(STAMM, 2007);(RODRIGUES; MACHADO, 2016)

## STAGES OF THE CLINICAL REASONING: HOW DOES IT?

Understanding the stages of the Clinical Reasoning process allows the ability to think and reason supported by the skills for critical thinking, helping in diagnostic or therapeutic decision making.

Thus, as a didactic way, the stages of the Clinical Reasoning process can be presented as a sequential chain, in which one stage depends on the other for its functioning and development.

**Figure 1-** Stages of the Clinical Reasoning Process



Font: ARAGÃO; ALMEIDA,(2017)



## **DATA: 1ST STEP**

The first stage of the Clinical Reasoning process is the moment of knowing the patient's history, his complaint, his pain, a moment of listening and obtaining information. This phase is also called anamnesis, a main tool available to the professional to raise hypotheses through the complaints presented by the patient.

In addition to the data obtained from the anamnesis, the findings of the physical examination are added, whose performance must be meticulously and recorded in detail. The physical examination still does not presuppose any degree of guidance for a diagnosis, despite being directed according to the patient's complaint.

TABLE 2 - ANALYSIS: DATA COLLECTION

## ANAMNESIS: DATA COLLECTION

### Patient identification

Name, age, date of birth, affiliation, marital status, race, sex, religion, profession, place of birth, address and contact.

### Chief Complaint

Brief description of the reason for the consultation.

### History of the current illness

Report of illness, onset, main signs and symptoms, duration, form of evolution, consequences, treatments performed, hospitalizations, other relevant information.

### Family History

Previous illnesses in the family, health status of the parents, if deceased, age and cause, main occupation of the parents, how many children, form of family relationship, in the psychiatric evaluations to record the existence of mental illness in the family.

### Personal history

Information about her pregnancy and the mother's intercurrent illnesses during pregnancy, birth conditions, psychomotor development; childhood intercurrent diseases, vaccination cycle, learning at school, sociability at home, school and in the community; work, illness at work, interpersonal relationships in the family, at work and in the community; puberty, sexual and reproductive life, menopause and andropause; preexisting diseases related or not to the current illness; current life situation; some religion.

### Habits

Use of medications sedentary lifestyle, alcoholism, smoking, among other customs.

### Exams

Physical exams, mental exams (for psychiatry and neurology), complementary exams, diagnosis.

Font: Rules provided for in Resolution 2056/2013 of the Federal Council of Medicine (CFM), chapter XI of the Anamnesis and Physical Examination, Medical Prescriptions and Evolutions, article 51; modified by CFM Resolution No. 2153/2016.

## HYPOTHESES: 2RD STEP

After listening to the patient's complaints and reflecting on the information obtained, it is time to raise possible hypotheses. The construction of hypotheses, usually in a number of 3 to 5 possible diagnoses, starts from the possible problem formulated and refers to an assumption or provisional solution by means of what is assumed and which is intended to be verified or discarded. Each hypothesis raised implies a method for the investigation. Despite its provisional nature, the hypothesis is a resource that is used in the face of the need to overcome a problem and obtain knowledge that is still argued. In this way, the hypothesis contributes to give meaning to generalizations and helps to organize and unify the knowledge already acquired. It does not matter whether hypotheses will be replaced by new hypotheses; the important thing is that scientific knowledge is constructed and re-elaborated to formulate a coherent and enlightening theory.

To Barros (2008, p. 154),

A good test to verify whether we are on the right path in terms of formulating hypotheses is to go now associating each hypothesis with its possible verification procedures or methodologies to be used, with the materials from which this verification can be carried out, in order to in addition to its theoretical basis and its articulation with the theme.

The role of the hypothesis is seen as a tool that proposes a unique function in the elaboration of a correct and precise diagnosis; therefore an indispensable resource. According to the same author, hypotheses have some functions and they are;

**TABLE 3- MAIN FUNCTIONS OF THE HYPOTHESES**

# MAIN FUNCTIONS OF THE HYPOTHESES

<b>Guiding</b>	Function to guide and direct which path and procedure I should follow;
<b>Complementing</b>	Function of finishing and filling in gaps to expose clarification;
<b>Argumentative</b>	Function of conducting induction and deducing something;
<b>Interpretative</b>	Function of determining, proposing a possible solution to something investigated.

(BARROS, 2008, p. 152)" the hypothesis is actually a resource that human reasoning uses in the face of the need to overcome the impasse produced by the formulation of a problem and in the face of the interest in acquiring knowledge that has not yet been has.

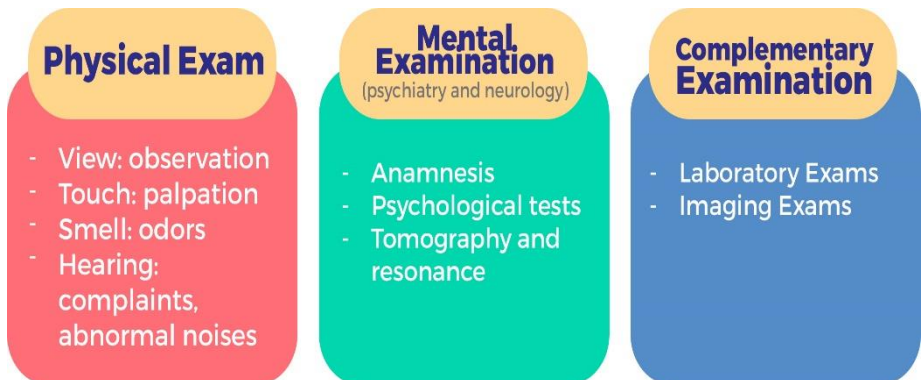
Font: Barros (2008).

## HYPOTHESES TESTS: 3RD STEP

This stage consists of the systematic testing of the hypotheses raised from the knowledge on which its initial formulation was based. This makes it possible to verify if the sample data provide evidence and if a decision is made between two or more hypotheses. “The scientist proposes a hypothesis, defines its implications, and designs experiments to test the hypothesis. If the experiment contradicts your hypothesis, it is eliminated; if expectations are confirmed, the hypothesis is supported”. (RÉA-NETO, 1998, p. 302).

It is worth remembering that you should avoid looking at complementary exams before listening to and examining the patient. The exams serve as adjuncts to data collection and physical examination. If data collection and physical examination are flawed, then laboratory and imaging tests need to be more complete, and their results will possibly be less elucidating than those obtained from a good initial investigation.

Figure 2- Types of ex



Font: SANTOS et al.(2020)

## RESULTS: 4 RD SETP

After collecting data and testing hypotheses, it is time to choose additional tests that will help in the hypotheses raised, a situation that involves study, analysis and reflection and request for exams. The result must be used to confirm or reinforce the probability of the hypothesis or problem and thus eliminate others.

It is a time to compare, a process that starts from the unknown to the known. The result of the examination or diagnostic procedure will confirm or not the hypothesis raised, which may provide new clues of the disease, or of the complaint heard. In this phase, there are two situations that develop in parallel: the confirmation of a diagnostic hypothesis and the discarding of other morbid conditions.

Figure 3- Elements of Results



Font: IDÁNEZ; ANDER-EGG, (2008, p. 19); PEIXOTO; SANTOS; FARIA, (2018).

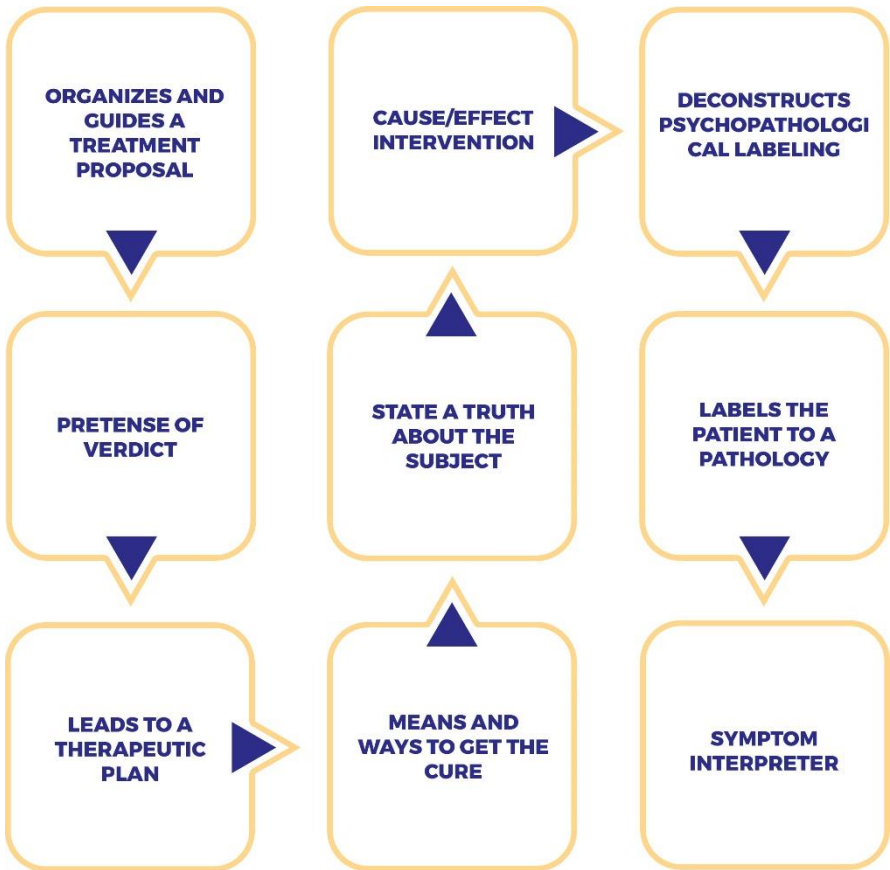
## DIAGNOSTIC PROOF: 5RD STEP

In the fifth stage, the professional with a clear view of the hypothesis and with the results of the exams is able to decide for a correct and concise diagnosis. The diagnosis must be a synthesis of the problem situation and must establish the interconnection of the elements and the elaboration of an action program. This brief reference to the verbal structure of the term serves as a first approximation to define the concept to be clarified.

A diagnosis is based on the results to understand the data and formulate an intervention proposal. It is not carried out just to know, but also to know what to do and how to intervene. “Any diagnosis is always supported by applied research. It is about carrying out a study in order to obtain knowledge to produce introduced and/or planned changes” (IDÁNEZ; ANDER-EGG, 2008, p. 19).

Reaching a diagnosis is not an easy and quick task, but a path that requires knowledge with applicability of content, experience with the application of procedures and resources available for complementary exams. Diagnosing represents a qualification given to professionals that brings with it the aspiration to determine a disease by observing its symptoms. “Diagnosis emerged as discernment, decision-making capacity and, today, it means, in a clearly predominant way, if not exclusively, the medical act of determining the cause of symptoms or disease”. (SAVART; et al., 2004, p. 24).

**Figure 4-** Purpose of the diagnostic paper



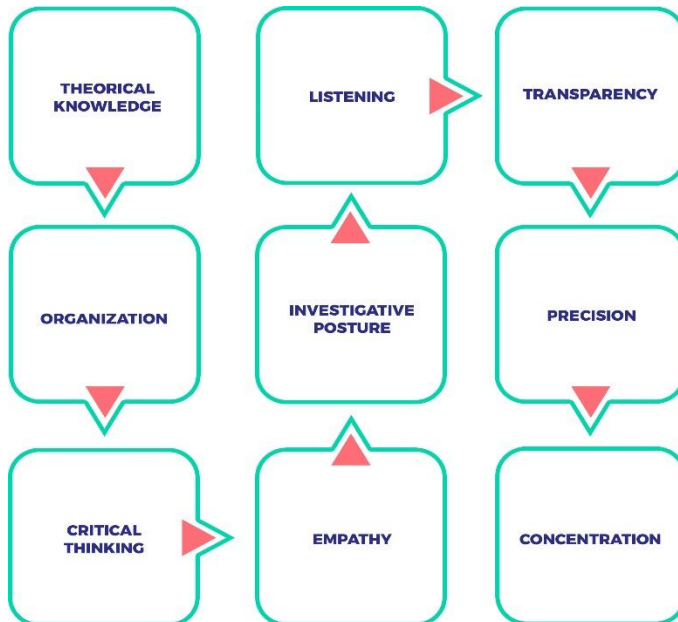
Font: FINELLI; MENDONÇA (2015)



## THERAPEUTIC PLAN:6RD STEP

At this stage, the professional can start planning for the patient, indicating interventions for the analyzed situation. With the correct diagnosis, a better therapeutic alternative becomes possible with more confidence in the evolution of the prognosis of the disease. To reach standards of diagnostic accuracy, the professional needs to have consistency in the competencies attributed to the practice of medicine or a related area, skills, knowledge and experience are some of them. Several factors can interfere in the decision-making process: theoretical knowledge, experience gained in practice, judgment, reasoning and common sense. (CARVALHO; OLIVEIRA-KUMAKURA; MORAIS, 2017, p. 692).

Figure 5- Skills for closing the therapeutic plan



Font: CARVALHO; OLIVEIRA-KUMAKURA; MORAIS (2017).



**PART 2**

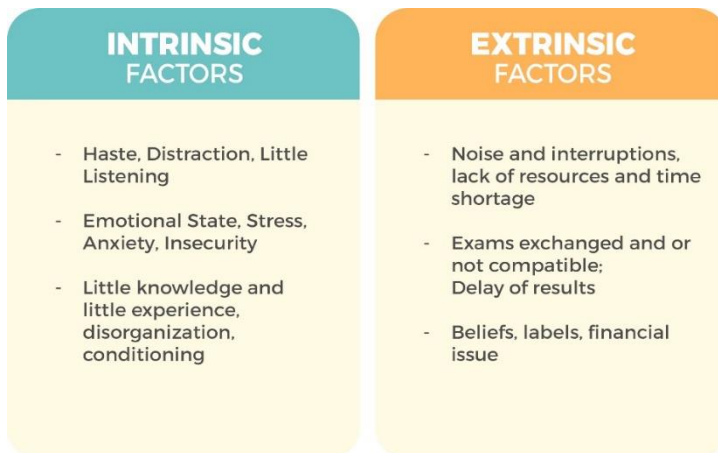
**INTERVENING  
FACTORS,  
ANALYTICAL AND  
NON-ANALYTICAL  
SYSTEM, DECISION  
MAKING AND  
HEURISTICS**

## INTERVENING FACTORS

Adverse events and inadequate outcomes are identified and recorded as a result of carelessness and negligence during treatment. Such events reflect the gap between real care and ideal care. (DUARTE et al., 2015). Despite the myriad of new resources, human error is one of the factors that stands out in health professionals due to negligence, overconfidence, lack of knowledge, lack of experience, deductions, psychological and emotional issues and so many other factors that affect the patients.

For Duarte et al; (2015, p.145) “the error or incident can be defined as the event or circumstance that could have resulted, or resulted in unnecessary harm to the patient, and may arise from intentional or unintentional acts”. In this way, intervening factors that impair and/or hinder the clinical reasoning process and favorable attitudes towards the evolution of the process will be addressed.

**Figure 6-** Factors Intervening in the Clinical Reasoning Process



**Font:** Prepared by the author

**Figure 7-** Example cycle of intervening factors



**Font:** Prepared by the author

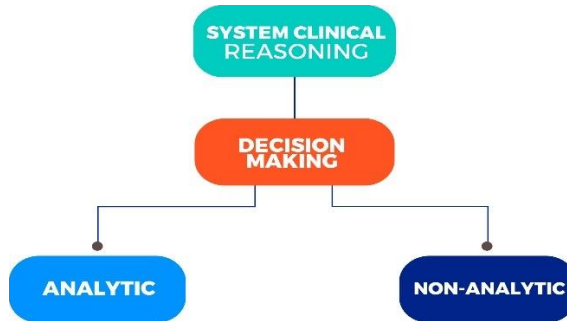
#### QUADRO 4- FATORES E ATITUDES FAVORÁVIES AO PROCESSO DE RACIOCÍNIO CLÍNICO

PHASES	FACTORS AND FAVORABLE ATTITUDES
<b>DATA</b>	Interest Objectivity Safety Knowledge Experience active listening Road map Type of questions (open and closed)
<b>HYPOTHESES</b>	Heads up Quick thinking Supervision Investigative posture Hypotheses according to the disease Request for examinations consistent with the complaint Critical judgment
<b>TEST OF HYPOTHESES</b>	Agility Objectivity Knowledge
<b>RESULTS</b>	Complementary exams Review of hypotheses Objectivity, attention Agility Knowledge Investigative posture Clinical judgment
<b>DIAGNOSTIC PROOF</b>	Complementary exams Heads up Supervision Reasoning, memory Decision making Critical thinking
<b>THERAPEUTIC PLAN</b>	Safety Attention, concentration Reasoning Memory Critical Thinking Self knowledge

**Font:** Prepared by the author

## ANALYTICAL AND NON-ANALYTICAL SYSTEM

**Figure 8-** Decision Making: Analytical and Non-Analytical System



**Font:** Lent; Xavier; Cezar-Vaz, (2019).

When it comes to processing information that enables decision-making in a clinical context, reality is a process and human beings use mechanisms to facilitate the decision-making process: one fast and inductive and the other slow and deductive, which give rise to the Theory of the Dual Process.

In contemporary times, one of the scholars referring to the Dual Process Theory is the Israeli theorist Daniel Kahneman. In this Dual Process Theory, the structuring of clinical reasoning has two components: one non-analytic and the other analytical.

Lent; Xavier; Cezar-Vaz (2019) propose in his article “Nurses’ clinical reasoning: an approach according to the Dual Process Theory” in which Clinical Reasoning is composed of two information process systems that allow, thus, decision making.

**Figure 9- System Characteristics**



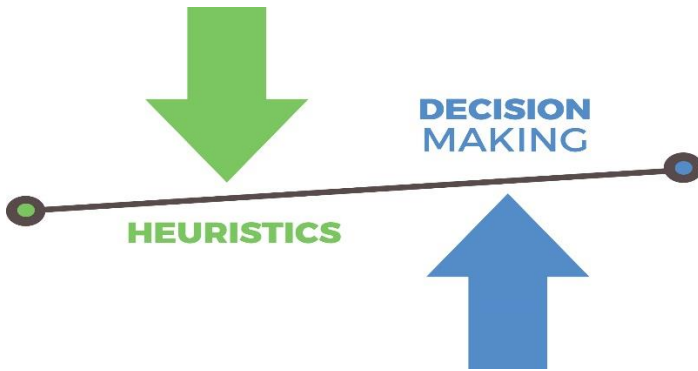
Font: Quaresma; Xavier; Cezar-Vaz, (2019).

Although the two components have specific characteristics, the two also work together. However, the Analytical works slowly and deductively and the Non-Analytical works quickly and inductively. The Analytical system normally works by monitoring the activities of the Non-Analytical system in order to identify and correct possible errors. These errors generated by the Non-Analytical sometimes fall into the risk of bias when comparing different situations, and the Analytical manages to stop these errors by correcting and re-educating the patterns of the Non-Analytical system.

When this does not occur, mistakes occur in the production of thoughts and decision-making. When the Non-Analytical process presents difficulties in processing content, Analytical is activated and the content is interpreted and analyzed; carrying out the decision-making process. Analytical reasoning rests on attention and mental effort, strengthening its validity. It is worth remembering that, when errors related to this reasoning component occur, the individual has a lack of knowledge, little mental effort and inattention during the process. (QUARESMA; XAVIER; CEZAR-VAZ, 2019).

In this way, the conjecture of the Dual Process Theory, as well as the knowledge of the factors in this process, has the potential to benefit the promotion and reduction of reasoning errors and improve and improve skills in care practices.

## DECISION MAKING AND HEURISTICS



For D’Carlos, Barbosa, Oliveira, (2017, p.19), “heuristics aim to instruct people on a certain subject, indicating the best way to perform a task to avoid the most common mistakes”. It can be said that they are tools that help to find answers to most problems in an easier way, without requiring much mental effort. Generally, in many cases, the answers will be right, if the professional has experience and knows what he is doing.

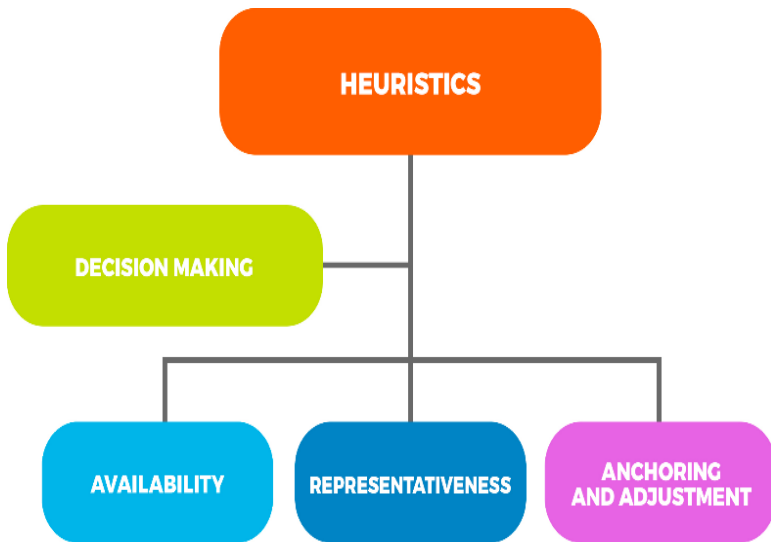
In a way, when it is necessary to make several complex decisions quickly, heuristics play a fundamental role, as they enable adequate choices. These are rules or strategies that speed up and/or simplify the evaluation of information and lead to the appropriate decision. (TONETTO et al., 2006). However, other times the hypothesis raised for the first time will not coincide with the patient's problem, because heuristics can induce errors of perception, evaluation and judgment that escape rationality or are in disagreement with the theory of statistics. For the same author, these errors occur in a systematic and predictable way under certain circumstances, and are called cognitive biases. An example of cognitive bias is the premature



closure of a diagnosis, without lifting analytical thinking. (TANAKA, 2010).

Decisions are not always conscious and rational. Often, decisions are based on incomplete and imperfect information, with no comparisons, reasoning, critical thinking and science of possible variables, which often impairs a diagnosis. For Tonetto et al., (2006), many decisions are made under uncertainty when the probabilities associated with the possible outcomes of a decision task are not known. Decision making problems consist of lack of knowledge and experience. Understanding how the mind works during the decision-making process is of paramount importance to avoid the formation of judgments and uncertainties that lead to mental shortcuts and, then, make a diagnostic error. The following are three aspects of heuristics – availability, representativeness, and anchoring and tuning.

**Figure 10-** Aspects of Heuristics



## Availability

### DECISION MAKING

Decision making based on the frequency of data that comes to mind easily;

When making a decision, you quickly recall some examples and as these examples are more available to your memory, you will probably judge the results as being more common to occur.

The probability judgment is made in the cases known;

### RISK

Mistakes and errors in information processing.

### CLINICAL REASONING AND DIAGNOSIS

Premature diagnosis survey, without doing the clinical reasoning process or critical thinking.

## Representativeness

### DECISION MAKING

Decision making based on similarity, in which information appears in the mind.

Makes a decision comparing the current situation with the most representative mental prototype

### RISK

Does not take into account various factors that must be considered when judging probabilities.

Evaluate probability by representativeness, consequently, omit previous probabilities.

### CLINICAL REASONING AND DIAGNOSIS

Diagnosis based on similar or similar diseases, not taking into account other factors.

## Anchoring and Adjustment

### DECISION MAKING

The individual bases his estimate on the result of an incomplete calculation.

Decision making involves choices that are influenced by the emotions you are experiencing at the time of decision making.

### RISK

Tendency to adjust the answer based on some available initial information that will serve as an anchor. This anchor can influence the final diagnosis.

### CLINICAL REASONING AND DIAGNOSIS

Diagnosis based on incomplete information, saving time and cognitive effort.

Font TONETTO et al., (2006)



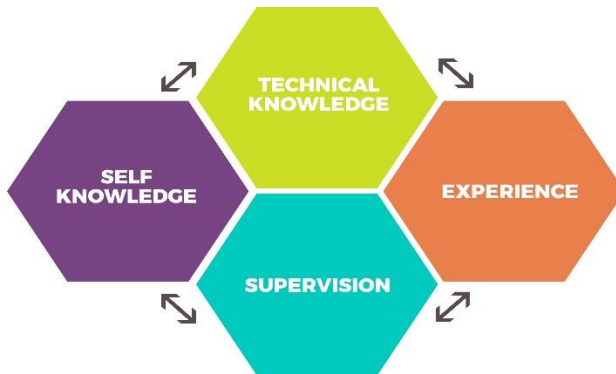
**PART 3**

**PERSONAL  
REQUIREMENT  
AND COGNITIVE  
PROCESS**

## PERSONAL REQUIREMENT

The process of Clinical Reasoning is a fundamental task in activities in the field of health. Its performance depends on multiple factors and its final result requires requirements that involve analysis and synthesis appropriate to clinical data and quality of decisions. (RÉA-NETO,1998). For this to occur, it is necessary to bring together elements that contribute to progress.

**Figure 11-** Personal requirements for the preparation of Clinical Reasoning



### TECHNICAL KNOWLEDGE

Study and connection with theory and practice

### EXPERIENCE

Observation, practice and analysis

### SUPERVISION

Mentor who helps

### SELF KNOWLEDGE

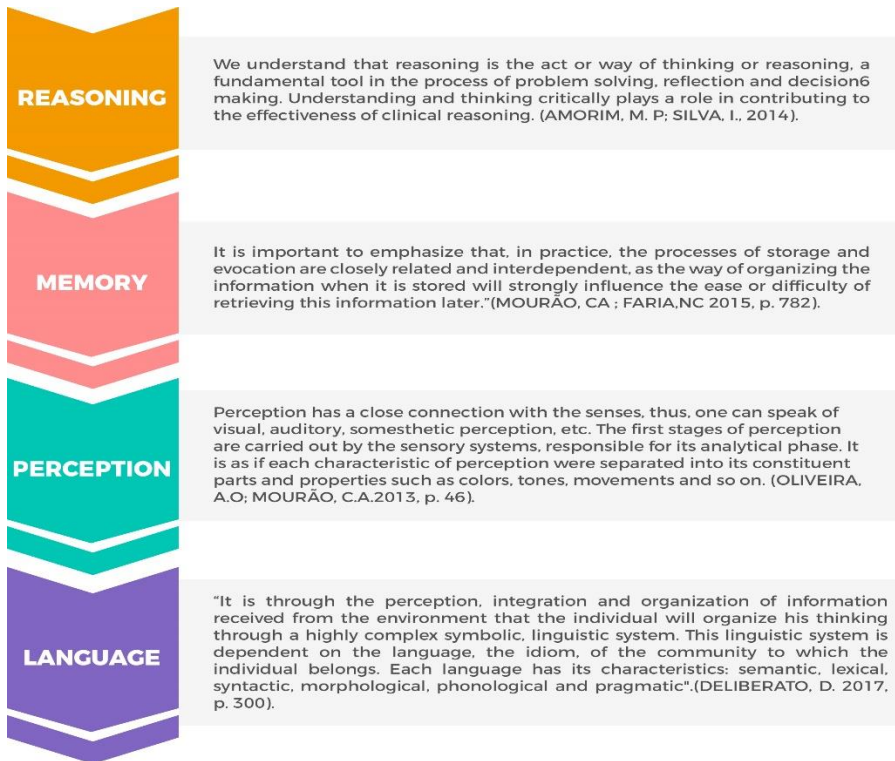
Beliefs, conditioning, empathy, self control, memory and conscience

Font:(RÉA-NETO, 1998); (AMORIM, 2013); (STAMM, 2007); (ARAGÃO; ALMEIDA, 2017).

## COGNITIVE PROCESS

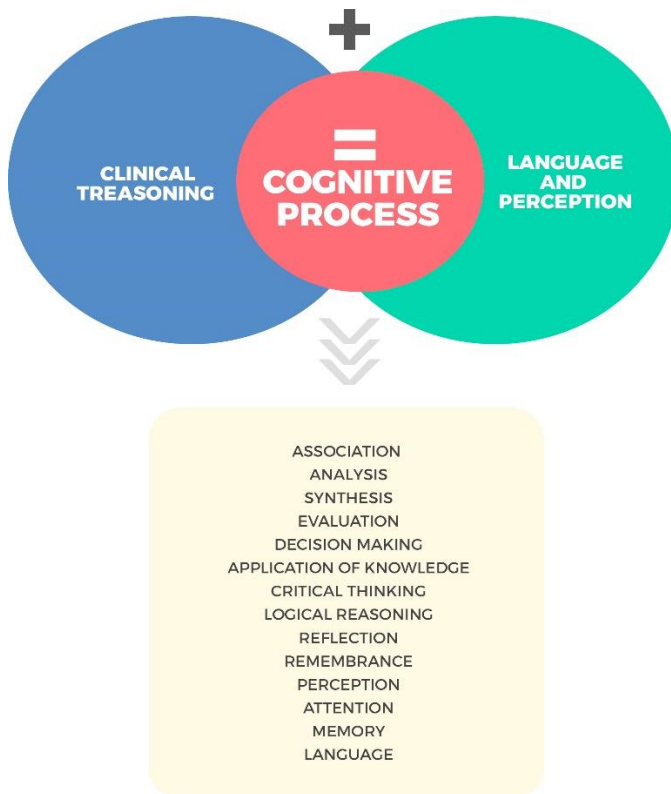
“Clinical Reasoning refers to the cognitive process through which the physician is able to establish the correct diagnosis and propose an appropriate conduct in the face of a clinical problem encountered”. (PEIXOTO; SANTOS; FARIA, 2018, p. 73). The process of building Clinical Reasoning is a complex, laborious and slow cognitive activity. This is due to the amount of information on which cognitive activity is built: reasoning, memory, perception and language are some of them. Here are the concepts of each of them.

**Figure 12- Cognitive Process**



Font: (AMORIM; SILVA, 2014); (MOURÃO; FARIA,2015);  
(OLIVEIRA; MOURÃO,2013);(DELIBERATO, 2017).

**Figure 13-** Clinical Reasoning and Cognitive Process



Font: Prepared by the author

The cognitive process is one of the factors that differentiate humans from other animals. Responsible for memory, thinking, reasoning, language, coherence, among other spheres, cognitive processing begins with the receipt of information, passes through the senses, in order to give meanings and be organized according to the capabilities of the mind. “The cognitive process refers to the study of information processing, that is, how human beings perceive, process, encode, store, retrieve and use information” (PEIXOTO; SANTOS; FARIA, 2018, p. 77).



**PART 4**

**CYCLE OF  
TEACHING AND  
STUDENT  
ATTRIBUTES**

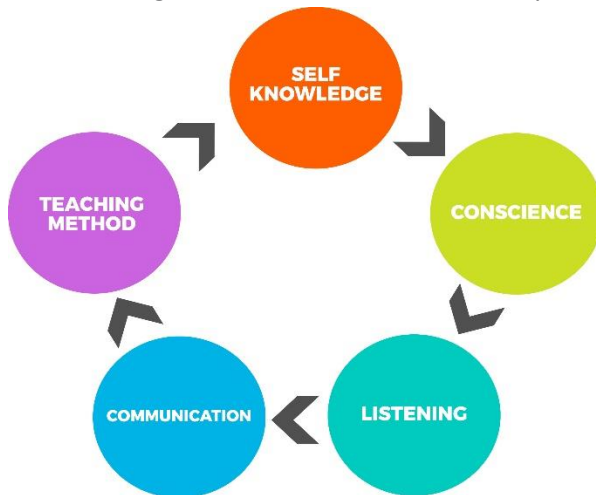


## CYCLE OF ATTRIBUTES: TEACHERS X STUDENT

“The classroom is the main space in which the initial relationships between student and teacher are worked”. (CUSTÓDIO et al., 2019, p. 118). In the interaction between professor and student, the professor has a fundamental role in the development of a good performance and ability of his student. It is the teacher who awakens in the student the interest in delving deeper into this subject. Necessarily, the teacher must be someone who has the sensitivity to interact and look at the class in a unique way. In the conception of Paulo Freire 1996, p.25 apud (GADOTTI, M. 2007, p. 32) “Those who teach learn by teaching and those who learn teach by learning”.

In this sense, there is a need for further discussion and studies on the relationship between professors and students, especially with regard to the teaching-learning methodology that directly impacts student education. A cycle of attributes for teaching skills for teachers is presented below.

**Figure 14-** Learning Skills for Teachers: Attribute Cycle



Font: Prepared by the author

### **Self-knowledge: (Ability: knowledge of oneself);**

- Thought, feeling and action are interconnected;
- Self-awareness allows us to observe in action;
- Aware of their thoughts, they tend to control their emotions more;
- Expansion of empathy in order to experience different visions;
- Memory is used to know facts and experience serves as a basis for decision;

(GADOTTI, M. 2007); (BALDUINO et al., 2012)

### **Conscience (skill: empathy)**

- To be aware that the student's clinical reasoning is in a process of construction and formation, and this includes; knowledge, experience, critical thinking, cognition;
- Develop empathy and patience in the face of teaching and learning;
- Raise awareness of whether the teaching methodology is effective in the teaching-learning process;
- Recognize and respect that learning appropriation varies among students;
- Establish new forms of relationship with the student;

(MADRUGA; SILVA, 2009); (GADOTTI, 2007); (NUNES et al., 2013); (BALDUINO et al., 2012); (ARAGÃO; ALMEIDA, 2017)

### **Listen: (skill: patience)**

- Exercise and improve listening in front of the student;
- Recognize that the other is a possible source of differentiated perception and has something to contribute;
- Develop listening with focus, attention and concentration;
- Recognize that listening requires empathy;
- Manage listening without prejudice, deductions and criticism;

(MESQUITA; CARVALHO, 2014); (MOURA; GIANNELLA, 2016); (SOARES et al., 2014); (GADOTTI, 2007); (NUNES et al., 2013); (BALDUINO et al., 2012)

### **Communication: (skill: clarity)**

- Manage your speech so that the other listens and understands you;
- Recognize that it is not what you say, but how you say it that interferes with teaching-learning;
- Knowing that we react differently to the same thing depending on how it is presented;
- Raise awareness that non-verbal expressions are a way of communicating;
- Measure emotion in the voice with pauses, clarity, rhythm, intensity and firmness;

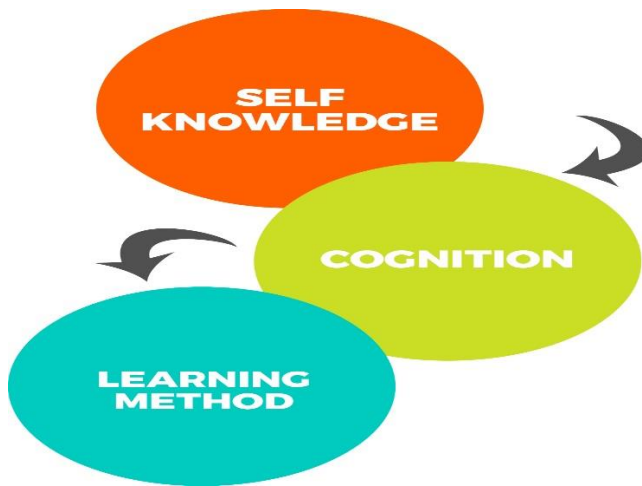
(CASTRO; SILVA, 2001); (GADOTTI, 2007); (NUNES et al., 2013)

### **Teaching Method: (Skill: cognition)**

- Stimulate the connection of theory with practice, carry out confrontation with literature;
- Integrate actions and programs to improve clinical reasoning;
- Develop teaching methods that develop critical thinking in the student;
- Properly use the information so that the student is able to diagnose and solve health problems;
- Commit to the teaching process and development of content assimilation;

(SOARES et al., 2014); (MELO-DIAS; SILVA, 2019); (GADOTTI, 2007); (NUNES et al., 2013); (ARAGÃO; ALMEIDA, 2017).

**Figure 15**-Learning skills for students: attribute cycle



Font: Prepared by the author

### **Self knowledge**

- Manage emotions such as stress and anxiety that compromise training and practice;
- Realize that thought, feeling and action are interconnected;
- Develop an investigative posture, with neutral listening and technical speech;
- Monitor and regulate their own actions through self-reactive influences;
- Identify beliefs and conditioning and weaknesses that influence speech and posture;

(MELO-DIAS; SILVA, 2019); (MADRUGA; SILVA, 2009); (BALDUINO et al., 2012); (PIOVEZAN, 2008)

## **Cognition**

- Relate critical thinking to reasoning, attention and observation;
- Improve listening with focus, attention and concentration;
- Develop strategies for formulating hypotheses and diagnosis;
- Manage observational learning through four processes; attention, memorization, behavior, and motivation;
- Develop a reciprocal triadic relationship between internal stimuli, external stimuli, and behavior.

(CASTRO; SILVA, 2001); (MELO-DIAS; SILVA, 2019); (SOARES et al., 2014); (AMORIM, 2013); (MADRUGA; SILVA, 2009)

## **Learning Method**

- Develop a learning method with listening, observation, communication and reading;
- Ensuring that their training and practice must be continuous and integrated;
- Possess skills and abilities to assess, systematize and decide the most appropriate conduct, based on scientific evidence;
- Manage listening without prejudice, deductions and criticism;
- Submit in stages; extension programs; complementary studies and courses, assuming an ethical, humanistic and social commitment to training.

(CASTRO; SILVA, 2001); (MELO-DIAS; SILVA, 2019); (SOARES et al., 2014); (AMORIM, 2013); (PIOVEZAN, 2008)



**PART 5**

# **ALBERT BANDURA'S SOCIAL COGNITIVE THEORY**

**(CLINICAL REASONING AND  
TEACHING-LEARNING)**

## **EDUCATIONAL ACTION INSTRUMENT: ALBERT BANDURA'S SOCIAL COGNITIVE THEORY**

In the early 1960s, Albert Bandura proposed the Social Learning Theory which, after reformulations, became known as Social Cognitive Theory (1986). The Canadian Psychologist offers a theoretical basis on Social Learning by defining that a person's development and functioning consist of the relationship between internal stimuli, external stimuli and behavior. To Torisu; Ferreira, (2009) the behavior of the individual, personal factors and the environment mutually influence each other in the Social Cognitive Theory and this relationship is called triadic reciprocity. The human being is a social being, and thinking about the teaching and learning process configures a range of interrelated aspects.

Thus, in this intervention model based on Social Learning, learning takes place through observation and experience and is maintained or modified by social consequences, in a process of intrinsic and extrinsic factors. According to Melo-Dias; Silva, (2019, p. 104), "it is through the symbolization of the world and of oneself that the person processes and transforms moments, elements and transitions into cognitive models that constitute guides for reasoning and action".

In this context, teachers can work to improve emotional states, academic and practical skills, negative habits, erroneous beliefs, acting in a way to spread the success of students. (TORISU; FERREIRA, 2009). In this way, knowledge of the principles of modeling procedures serves as resources to plan, execute and evaluate the teaching of knowledge, actions and skills to your student.

Using the Social Cognitive Theory as a reference, learning by observation is thus governed by four interdependent processes: attention, memorization, behavior and motivation. Therefore, the use of these processes innovates behaviors and makes new choices. In this sense, we present the four processes necessary for the induction of clinical reasoning through observation through Albert Bandura's Theory of Social Learning.

**Figure 16- Learning by observation**



Fonte: TORISU; FERREIRA, (2009).

**TABLE 5- FIRST ELEMENT: ATTENTION**

<b>ATTENTION: OBSERVATION</b>	
<b>CONCEPT</b>	Learning takes place through modeling (observation) through attention to imitating a model (teacher).
<b>HOW IT HAPPENS</b>	We learn by observing the performance of models either by direct observation or readings or other mediating instruments. Thus, the greater the ability to prolong attention to process information and compare performance with representations, the greater the form of learning.
<b>APPLICATION OF ATTENTION TO THE AID OF CLINICAL REASONING</b>	<ul style="list-style-type: none"> <li>- Attention to the teacher's speech and behavior;</li> <li>- Prolonged attention to the teaching method;</li> <li>- Attention to significant aspects of behaviors;</li> <li>- Attention to complex activities and affective tasks;</li> <li>- Attention to symbolic representations that will guide future behavior;</li> <li>- Observation in the reasoning process for the diagnosis formulation;</li> <li>- Observation in the examples as a way of learning;</li> <li>- Observation on the actions they will need to perform in the future;</li> <li>- Be selective about what you observe;</li> <li>- Formulation of new ideas and behaviors;</li> <li>- Goals focus attention.</li> </ul>

Font:(MADRUGA; SILVA, 2009); (AMORIM, 2013); (MELO-DIAS; SILVA, 2019); (GUEDES; OLIVEIRA, 2013); (AZEVEDO, 1997); (TORISU; FERREIRA, 2009); (AGUIAR, 1998); (POLYDORO; AZZI, 2009).



**TABLE 6- SECOND ELEMENT: MEMORY**

**MEMORY: INFORMATION RETENTION**

**CONCEPT**

It comprises the information from observation that is encoded, translated and stored in our brain, according to an organization by patterns, in the form of images and verbal constructions.

**HOW IT HAPPENS**

We remember best when we deal with situations similar to early learning environments and thus remember and apply what we learn.

**APPLICATION OF MEMORY TO THE AID OF CLINICAL REASONING**

- Information retention through observation;
- Ability to remember what you observed;
- Symbol encoding;
- Ability to retain and organize this symbolic encoding;
- Rehearsal of acting and staging;
- Likelihood of reproducing information;
- Learning new content with information previously stored in memory;
- Ability to remember in the absence of the model;
- Better recall and retention when dealing with situations similar to early learning environments;
- Memorized elements are guides to the observer's performance;
- The retention of information facilitates the action and execution of the memorized content;

Font:(MADRUGA; SILVA, 2009); (AMORIM, 2013); (MELO-DIAS; SILVA, 2019); (GUEDES; OLIVEIRA, 2013); (AZEVEDO, 1997); (TORISU; FERREIRA, 2009); (AGUIAR, 1998); (POLYDORO; AZZI, 2009).

**TABLE 7- THIRD ELEMENT: EXECUTION**

**BEHAVIOR: EXECUTION AND ACTION**

**CONCEPT**

Reproduction consists of the ability to translate symbolic conceptions of behavior stored in memory into actions.

**HOW IT HAPPENS**

In producing behavior, the observer assesses his capabilities, organizes and reorganizes, and decides on responses as corrective action.

**APPLICATION OF ACTION TO THE AID OF CLINICAL REASONING**

- Reproduction of memorized symbolic understandings when there is action;
- Actions with positive consequences tend to continue and actions with negative consequences tend to diminish or disappear;
- Behavior can be corrected by feedback;
- Effort and persistence, in turn, work towards improving performance;
- Information and conceptions are compared with new information provided;
- Observation must be converted into action, so new behavior arises;
- Self-regulating operations and corrective feedback are converted into proficient performances;
- The individual's behavior, personal factors and the environment influence each other;
- Execute is responsible for copying the model's actions;
- Probability of learning to occur, to be reproduced when it is reinforced.

Font: (MADRUGA; SILVA, 2009); (AMORIM, 2013); (MELO-DIAS; SILVA, 2019 ); (GUEDES; OLIVEIRA, 2013); (AZEVEDO, 1997); (TORISU; FERREIRA, 2009); (AGUIAR, 1998); (POLYDORO; AZZI, 2009).

**TABLE 8- FOURTH ELEMENT: MOTIVATION**

**MOTIVATION: REINFORCEMENT**

**CONCEPT**

Motivated behavior is goal-directed behavior;

**HOW IT HAPPENS**

A learned behavior will only be performed if the observer is motivated to do so;

**APPLICATION OF  
MOTIVATION TO THE  
AID OF CLINICAL  
REASONING**

- Observers are motivated to learn through punishment and reward;
- Comparisons with behavior with internal standards in a process of self-assessment, self-direction and self-reinforcement.
- Behavior above your standards feeling of satisfaction, below your standards, feelings of dissatisfaction and guilt;
- Unsatisfactory results or consequences serve as motivation; Incentives can be extrinsic or intrinsic,
- Goals and self-assessment are important elements of motivation,
- Goals improve performance, on cognitive and motivational mechanisms,
- Observers are selective in what they focus on and are influenced by their motivation;

Font: (MADRUGA; SILVA, 2009); (AMORIM, 2013); (MELO-DIAS; SILVA, 2019 ); (GUEDES; OLIVEIRA, 2013); (AZEVEDO, 1997); (TORISU; FERREIRA, 2009); (AGUIAR, 1998); (POLYDORO; AZZI, 2009).

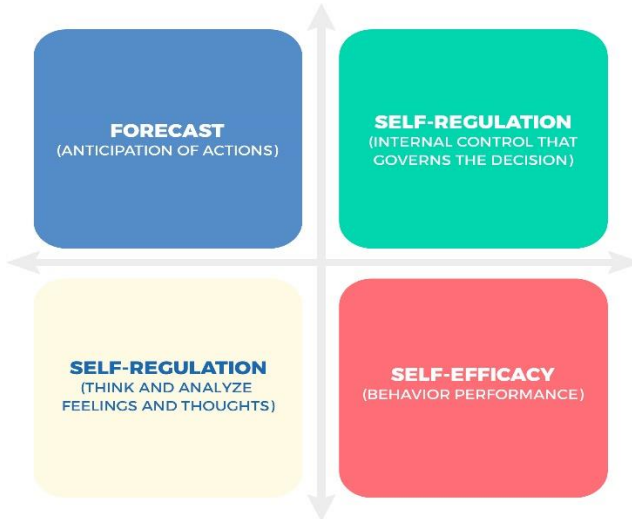
## CAPABILITIES THAT GOVERN LEARNING AND PERFORMANCE

Following the line of Bandura's Theory, human behavior requires different fundamental capacities. Learning is an activity of processing and encoding information transformed into action. For Melo-Days; Silva (2019, p. 103);

the interaction between the person and their own abilities, in addition to the production of certain results, is in itself the path that also influences their development as a person and their psychosocial functioning in a complex network of reciprocal interactions.

In this way, the Social Cognitive Theory strongly contributes to the studies of human development, which presupposes a network of knowledge and capacity schemes. The contribution of capacities at each stage of the clinical reasoning process is evidenced below.

**Figure 17-** Contribution of dimensions to the Clinical Reasoning Stages



Fonte: (MELO-DIAS; SILVA, 2019),(AZEVEDO, 1997),(POLYDORO; AZZI, 2009)

**TABLE 9 - FORECAST AND SELF-REGULATION**

<b>PREVISION</b>	<b>DATA</b>	Establish a checklist for the anamnesis in order to redirect the interview.	<b>HYPOTHESES</b>	Establish neutral listening so you don't fall into the conditioning trap.	<b>TEST OF HYPOTHESES</b>	Raise awareness and monitor judgments before ordering exams.
	<b>RESULTS</b>	Analyze the exams taking into account the patient's history.	<b>DIAGNOSTIC PROOF</b>	Plan actions in order to obtain the best probability of results.	<b>THERAPEUTIC PLAN</b>	Prevent changing situations.
	<b>DATA</b>	Establish coherence between thought and speech and behavior when collecting information.	<b>HYPOTHESES</b>	Control and evaluate your cognitive, motivational, affective processes.	<b>TEST OF HYPOTHESES</b>	Possess self-knowledge about their own way of learning, its possibilities and limitations.
<b>SELF-REGULATION</b>	<b>RESULTS</b>	Make adjustments to current performances, enabling continuous improvement.	<b>DIAGNOSTIC PROOF</b>	Learning through the different models.	<b>THERAPEUTIC PLAN</b>	Set goals, use appropriate cognitive strategies

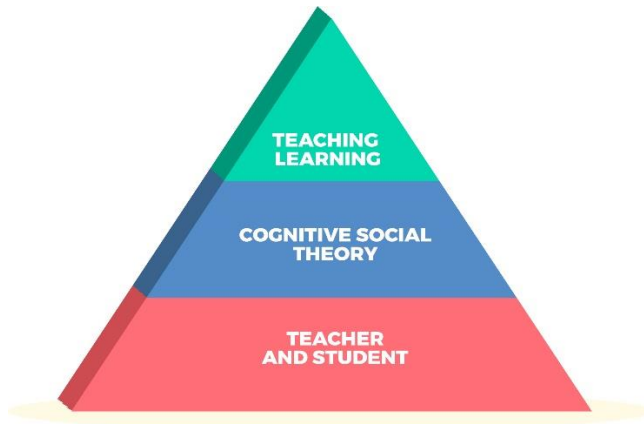
Fonte: (MELO-DIAS; SILVA, 2019),(AZEVEDO, 1997),(POLYDORO; AZZI, 2009)

**TABLE 10- SELF-REFLECTION AND SELF-EFFICIENCY**

<b>SELF-REFLECTION</b>	<b>DATA</b>	Analyze if there is an active observation that allows a logic of reasoning.	<b>HYPOTHESES</b>	Discriminate between correct thoughts and disturbed or incorrect thoughts.	<b>TEST OF HYPOTHESES</b>	Monitor whether there is an intervention differently.
	<b>RESULTS</b>	Change hypothesis if the exam requires, adapting to new results.	<b>DIAGNOSTIC PROOF</b>	Discriminate better diagnosis, judging them before the results.	<b>THERAPEUTIC PLAN</b>	Organize content that allows a treatment appropriate to the experimental and personal characteristics of the patient.
	<b>DATA</b>	Perceiving relevant clues or signs such as patients' facial expressions.	<b>HYPOTHESES</b>	Request supervision in the face of insecurity in the elaboration of the hypothesis.	<b>TEST OF HYPOTHESES</b>	Know the types of exams.
<b>SELF-EFFICACY</b>	<b>RESULTS</b>	Pay attention to the various variables that will have to be processed, weighted and integrated between hypotheses and exams.	<b>DIAGNOSTIC PROOF</b>	Improve technical knowledge to better diagnose.	<b>THERAPEUTIC PLAN</b>	Develop empathy for the patient.

Font: (MELO-DIAS; SILVA, 2019),(AZEVEDO, 1997),(POLYDORO; AZZI, 2009)

## COGNITIVE SOCIAL THEORY AND TEACHING-LEARNING



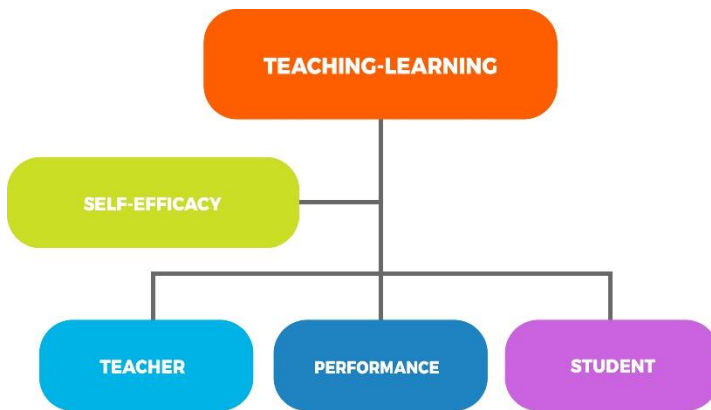
The relevance of the teaching and learning process occupies a prominent place in the domain of knowledge and skills development. The dimension of teaching and learning implies linking teaching contents to theoretical and practical requirements, in a process of assimilation and appropriation. The direction of the teaching process aims at procedures, methods and knowledge of guidelines. (LIBANEO, 1990).

The teacher, when directing the teaching process, must use a set of actions that best meets the assimilation of exposed content. Thus, the teaching and learning process is characterized by the combination of activities between teacher and student, and the effective direction of this process depends on the relationship of objective, content and method. It can be said, therefore, that these considerations seek to show the need for the teacher to adopt a positive and motivating attitude that encourages and encourages the student to develop critical behavior in the face of problems and facts of reality.

For this, Albert Bandura's Social Cognitive Theory, an area of Cognitive Psychology that is part of the Social Learning Theory, helps not only in understanding human behavior, but also in self-efficacy, one of the pillars of Bandura's theory. Self-efficacy allows the student to feel more motivated and more empowered to perform a task with a better chance of success, since he will have self-efficacy beliefs. For Bandura (1986), perceived self-efficacy “is defined by people's judgments about their ability to organize courses of action required to obtain certain types of performance.”

For this, the teacher needs to know, put into practice the theory and enable the student to believe in self-efficacy and, in this way, act in favor of the student's transformation and self-development.

**Figure-18** - Self-efficacy and Teaching-Learning



Font: Prepared by the author

Upon entering Higher Education, some university students arrive with weak skills and competences and deficiencies in information, cognition and organization processes. In order to meet the requirements of a quality higher education level and acquire knowledge, skills and self-efficacy, the student needs to take responsibility and take an active role in the learning process. However, for the teacher it involves developing methodologies that help him in this responsibility and performance.



As an example, some students have unrealistic beliefs or low self-efficacy, lack of knowledge and non-use of adequate strategies for study and learning, difficulties associated with reading comprehension and performing calculations, poor time management, low motivation and lack of strategies to regulate it, high anxiety and few strategies to regulate emotions inherent to the new academic demands.(CASIRAGHI; BORUCHOVITCH; ALMEIDA, 2020, p. 29).

Bandura's belief in self-efficacy is seen as a tool that aims to encourage students to evaluate their effectiveness by favoring self-monitoring and academic success, as well as being essential for designing educational interventions and strategic behaviors. To achieve academic success, self-efficacy promotes preventive actions and skills promotion by students with teacher influence. The teacher is a figure endowed with cognitive processes, affections and knowledge that influence and contribute to the student's learning process and performance. According to Costa and Boruchovitch (2006 apud MUNIZ; CHINELLI, 2013), it is necessary to provide the student with self-belief through intellectual instruments, develop skills to regulate their own behavior, observe and analyze themselves in their actions. For Bandura (1986 apud Bezerra, 2008), self-efficacy is directly related to the performance of human behavior. This is clear from the personal conviction that he is able to successfully perform tasks that determine results. Ability to perform actions with skills and willingness to achieve their purpose denounces the construction and relationship of self-efficacy and performance. For Bandura (1986), self-efficacy is based on four sources of information. The teacher's contribution to the student is presented below;

**TABLE: 11- SELF-EFFICACY AND ITS CONTRIBUTION IN TEACHING- LEARNING**

SELF-EFFICACY				
	CONCEPT	HOW IT HAPPENS	TEACHER HOW TO STRENGTHEN SELF-EFFICACY?	STUDENT WHAT CAN YOU LEARN FROM SELF-EFFICACY?
Personal experience (direct)	Domain experiences in relation to the exercise of some activity.	Direct experience with a task.	Exercises Group work Stages Practical class	Self knowledge Self confidence self monitoring Autonomy
Vicarious Experience (indirect)	It is the factor that generates efficacy beliefs through observation of other people performing certain actions.	Watching other people	Gestures Communication Way of thinking and reasoning	Performance Focus Judgment Motivation Persistence
Verbal persuasion	Social persuasion received with the intention of encouraging the other.	Evaluative feedback	Encourage Encourages Motivate Inspire Intervenes	performance Perception Goal result Reward
Physiological States	Emotional states that influence self-efficacy perceptions.	Judgment of your capabilities and strengths	Empathy Listening Interest Heads up	

Font: Prepared by the author

## FINAL CONSIDERATIONS

Clinical reasoning is a learned skill that requires superior cognitive function and rationality in order to respond efficiently and to move beyond traditional approaches. For this, the teaching and learning method must be extended to approaches and theories that have theoretical support with a level of information capable of developing the cognitive skills necessary for self-efficacy care.

The work presented here evidenced what is already known in the literature, it is clear that there is a need for greater depth in what concerns the teaching-learning methodology that directly crosses the construction of the clinical reasoning process. Regarding the teaching-learning approach in higher education and the clinical reasoning process, without intending to exhaust the subject, we seek to present a teaching and learning proposal through the approach of Albert Bandura's Social Cognitive Theory, a learning model that attention should be paid to promoting behavioral engagement in the learning process.

Bandura's theory favors and directs a look at educational models and strategies, providing the opportunity for the use of critical thinking and the development of clinical reasoning, a possibility of improving professional practice.

Added to this fact, the teaching profession is built from their values, their life history, their knowledge, anxieties and anxieties. It becomes increasingly necessary to rethink the training and practice of teachers and to re-signify the training processes based on the knowledge necessary for teaching. In the classroom, the teacher is far from being a simple reproducer of knowledge.

As an actor and author, each teacher consecrates being a protagonist in deconstructing and building identities, knowledge and representations. Teaching is a challenge inserted in your profession to incorporate new strategies and educational models of teaching. Teaching practice that

instructs the student for improvement and acquisition, contributes to prevention and intervention with accuracy.

Therefore, health education must incorporate educational models of teaching through pedagogical tools that train the student to act with assertiveness about the practice developed. In this perspective, teaching strategies centered on the student make them responsible for their learning and can result in effective and safe interventions, thus favoring correct interpretations aimed at the real needs of patients.

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