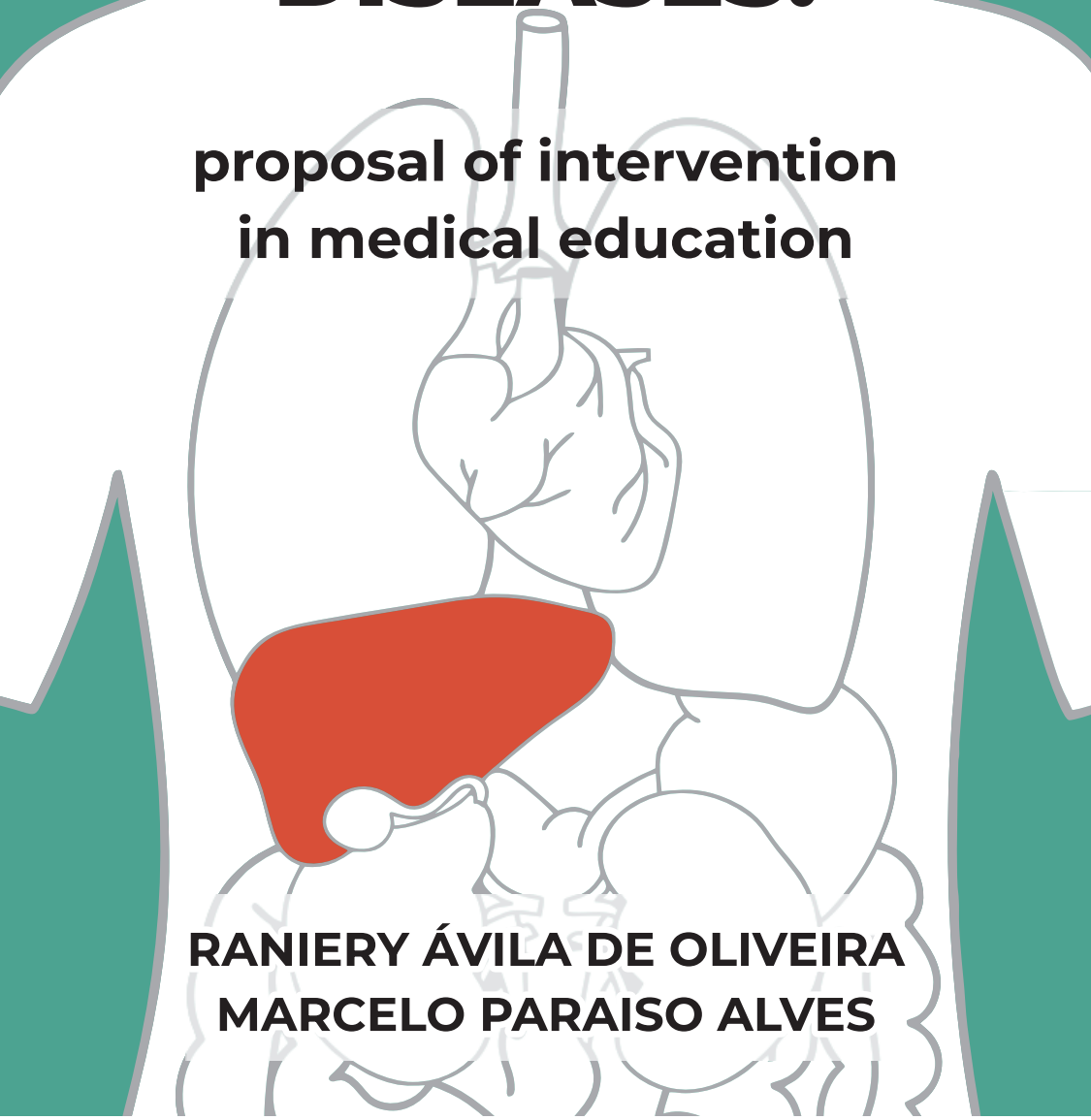
LABORATORY DIAGNOSIS OF LIVER DISEASES:

proposal of intervention in medical education



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MESTRADO
PROFISSIONAL
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DA SAÚDE E DO MEIO AMBIENTE

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Ficha catalográfica

Summary

PRESENTETION

This is the result of a survey conducted as requirement to obtain a Masters degree in Ensino em Ciências da Saúde e do Meio Ambiente of Centro Universitário de Volta Redonda/ Unifoa. This educational product (EP)_constitutes of a Didactic Sequence (DS) (MASSI; GIORDAN, 2014) for teaching of laboratory diagnosis of liver disease. Therefore, it is important to emphasize that this EP does not claim to encompass the diagnosis of all liver diseases, but it triggers paradigmatic reflection that promotes transformations in the reasoning of the future physician in such a way that it broadens their articulation skills among multiple determiners that influence the Laboratory Diagnosis and it also enables a look beyond the anatomo-biological reductionism and its consequent linearity.

In this sense, this didactic material is presented in the granted view of Rizzatti *et al*. (2020, p. 4), "[...] the tangible outcome of a process generated from research activity [...]", it allows epistemological thoughts, and from field data experiences, thinking of social intervention through proposal of paradigmatic change in Medical Education.

Likewise, it becomes relevant to stress that the PE/ EP (RIZZATTI et al., 2020) - SD - will grant the graduating student the ability to reason from semiologic perspective, interconnecting the plural information and assisting the laboratory diagnosis.

1 MAIN GOALS

1.1 General GoALs

To comprehend the Cartesian reductionism in medical training, proposing the Complex Reasoning as an alternative to the process of **learning-teaching** of laboratory diagnosis of liver diseases.

1.2 Specific Goals

- **To identify the determiners that influence the laboratory diagnose of hepathopaties;**
- **To relate the laboratory diagnosis to the decrease in the morbidity impact and, as a result, to the economic resource reduction of the health system;**
- **To discuss the practice of complex thinking, stimulating the clinical reasoning through interconnections between epidemiologic and syndromic data.**

2 SIGNIFICANCE OF THE STUDY/ STATEMENTS

Generally, in the two last years of training, the medical schools work on a way to provide fundamental clinical experiences for the future physicians since human relationship is extremely relevant to the construction of knowledge and setting of good interrelationships. The medical practice requires more than technical knowledge as it needs ability acquisition that enables humanized and holistic care. These abilities are indispensable for society to underlie the need of human contact for medical training (GOMES et al., 2020, p. 114).

Hence, this EP is justified by the need to develop fundamental competence for future physician: the clinical reasoning. This procedure is significant since it enables the physicians to choose the best way of selecting the exams which will entail greater assertiveness in the laboratory diagnosis.

Another aspect that justifies and makes this didactical material more relevant is the ability of complex thinking, in terms of expansion of the mentioned paradigm which permits evaluation of the vulnerability of health and disease processes. It also interconnects several determiners that influence the process such as, race, social class, gender, sexual orientations, area, among others as markers that interfere in the laboratory diagnosis.

Considering the previous paragraphs, it is important to highlight two other aspects that contribute to the relevance of the EP: the possible diminishing of comorbidities and the reduction of the economic impact.

According to the first impact – diminishing of comorbidity – it is noticed that, when there is effective contribution to diagnosis assertiveness, damage caused by liver diseases progression is consequently reduced.

Considering the second aspect - reduction of the economic impact – when it more assertiveness is set into data interpretation (related to laboratory diagnosis), there is contribution to the reduction of unnecessary expenses in the public and private health system. In the same perspective, the sooner and more precise the laboratory diagnosis, the lower is the economic impact, since expenses targeted towards late stage complications (in hepatopathy progresses) could be avoided.

3 TARGET PUBLIC

Professors who work in medical training, preferably the ones dedicated to where and when the process of laboratory diagnosis **learningteaching** is contextualized.

4 PLACE AND SUPPLIES

The proposed resource usage, EP (educational material – Didactic Sequence), can be inserted in any modules of medical education in which the learningteaching approach of laboratory diagnosis of liver diseases is needed, for example, during the medical internship activities.

The proposal for the applicability of this material is linked to the need of practical environment where the professor contact is weighed with the undergraduates, the health system users (known as patients) and digital platforms. It is estimated that there is a need of:

- **Laptop, computer or smartphones;**
- **Internet access.**

5 LEARNING APPROACHES

The learning theory, that grants epistemological subsidies to DS, is based on the Complex Thinking (MORIN; LE MOIGNE, 2000; MORIN, 2002) and on the Knowledge on Network Subjectivity (LIBÂNEO, 2005; SANTOS, 2008).

According to Santos (2008, p 35), the above-mentioned approaches convergence on the holistic perspective of reality: “[...] the reality as an integrational totality between the whole and the pieces but comprehending the dynamic and processes differently”.

Therefore, when we opt for the mentioned articulation, we search for, in the Complex Thought, the Principle: Hologrammatic, of Complementarity/ Dialogicity and Recursive in order to set a paradigmatic change on how undergraduates establish a relationship using the learned knowledge.

In regard to Hologrammatic Principle, to the very one operates from the logic that recognizes the lack of fragmentation or distinction between the whole and the pieces, on the contrary, this “[...] principle states that the whole piece is not inside the whole, as the whole is inside the pieces” (SANTOS, 2008, p. 73).

At another moment, Morin (2002) still draws attention to the fact that the whole is something supplanting the mere sum of the pieces, since

the qualities and properties that emerge from the whole are not manifested in the isolated pieces.

Based on this assumption, when considering the effective laboratory diagnosis in hepathology, we should favor the interconnection among all the determiners that embrace and interfere with the process of becoming ill to beyond the anatomo--biological reductionism.

Likewise, the Complementary/ Dialogic Principle (Santos, 2008) allows the intertwining of the considered opposites pairs (by the Cartesian perspective), i.e., while the linear thought runs in the binary perspective – character versus culture; body versus mind; sickness versus health – the complex logic transcends the above-mentioned reductionism when it favors the complementary characters of the opposites.

As we think of laboratory diagnosis of hepatophaties, it would be a misconception not to realize the need of complementarity, that goes beyond the mere sum of the pieces, among the various fields of knowledge, as well as how the social determiners that influence the health and disease relation.

Yet, the Principle of Recursion comes from a process in which the products and effects are, simultaneously, causes and results of what is produced. In this direction, the effects retreat into the causes: “[...] the human individuals produce the society in the interactions and because of interactions, but

society, as far as it emerges, produces the humanity of these individuals and supplies them with language and culture" (MORIN, 2001, p. 95).

In this sense, the analogy established in this paper between the Recursion Principle happens when the hepathology is considered as an area of knowledge in which the products and effects are, simultaneously, causes and consequences that retrofeed. This fact becomes explicit when the liver is conceived as methabolic source, because it is the cause-and-effect producer as well. Both create consequences towards other organs and systems: endocrine, circulatory, immune and others. So, when we think of laboratory diagnosis of hepathologies, we cannot disconsider all this context.

Likewise, the Principle of Recursion (MORIN, 2002) allows us to have one other bias od analysis. When we consider, as an example, the ocupacional diseases that, due to agrotoxin use, can result in liver necroinflamatory agression with consequent aminotransferase increase. This way, it will be necessary to establish interconnections, that assist the laboratory alteration interpretation, above all its casual connection. It is important to stress that, in this perspective, the limits of the biomedical and epidemiological paradigma, that subsidize the medical training and guide the health action drawings in SUS, must be rethought overcome the constrains in practice (RIGOTTO *et al.*, 2017).

Another extremely important data, once addressed by CIARDIM *et al*. (1986), and that is related to the Hologrammatic, Dialogic and Recursion principles (MORIN, 2002), is about the work leave. It, consequently, impacts the economy in a negative manner.

This way, there is a link between the interconnection of all determiners concerning alcoholism which interfere the process of getting sick, and the alcoholism effects which are, simultaneously, cause and consequence that are retrofed in the cascade of biological, social and economic phenomena regarding this scenery.

So, when we approach the Complex Thinking, it is viable to intertwine it to the Knowledge Network since the perception of the building of learningteaching process is noticed. This entanglement allows the perception of the above process. It favors the teaching intervention and the unique lives of the involved students as well as the relationships and sharing among the students (OLIVEIRA, 2012).

> In accordance with the notion of weaving of knowledge into networks, these are woven into networks built by all individual and collective experiences, how we are inserted into the constitutive dynamic of the world, and therefore not having the localizable origin and development, hierarchal priorities, predictability and route requirement (OLIVEIRA, 2012, p. 68).

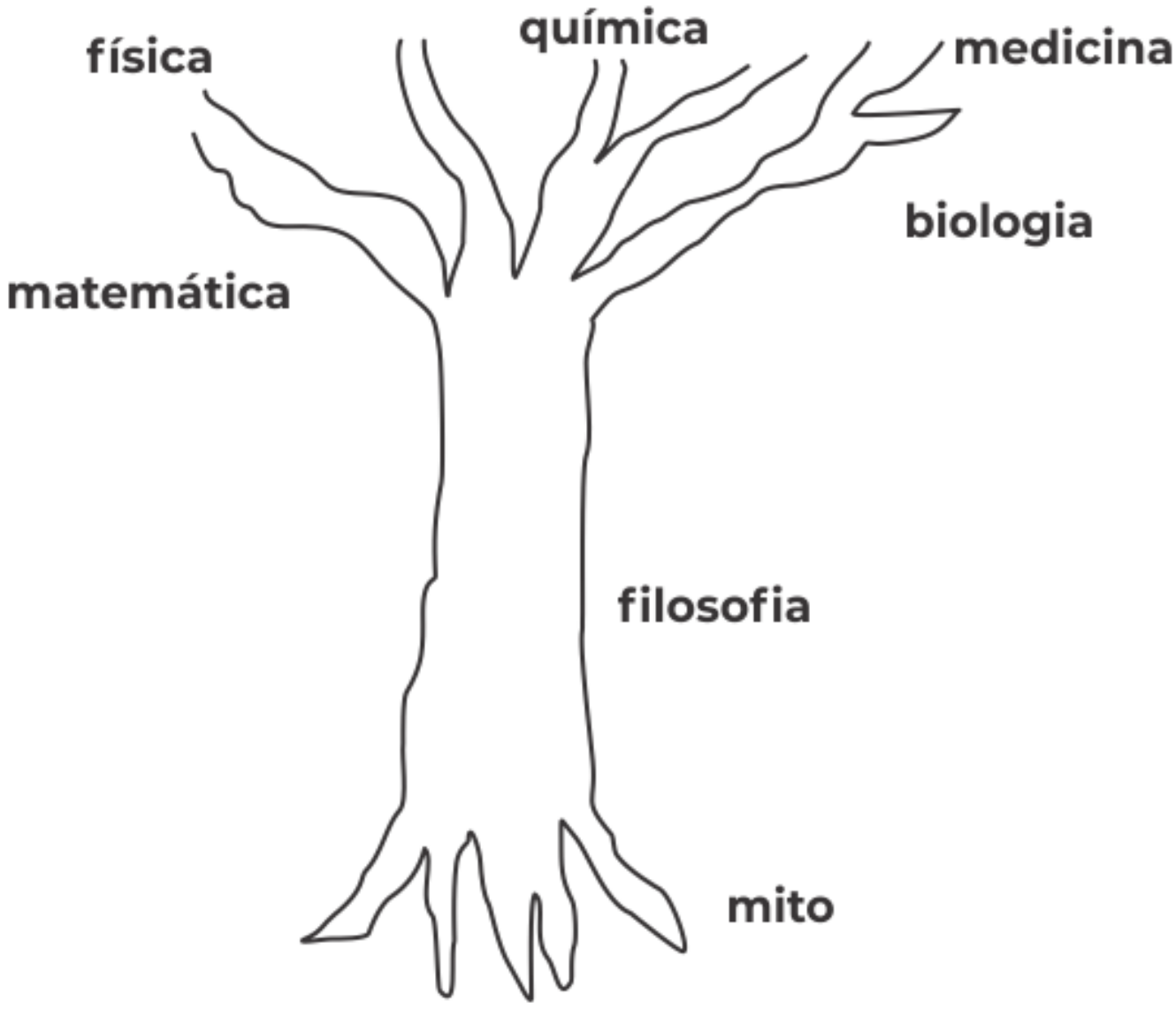
When we work with the knowledge Network notion, Oliveira (2012) draws attention to the imprevisibility of how the knowledge is produced.

To the author (OLIVEIRA, 2012), the nets of subjectivities (in which we are inserted and were forged) come from how we insert ourselves into the world. This statement comes from Santos's thought (2008) and the proposition that we are constituted from the entanglement of structural spaces: domestic, production, community, citizenship, market and world.

From this setting, Oliveira (2012) makes two statements that approach us to the Complexity Paradigm: first, the imprevisibility of control when we incorporate new experiences to our nets because of the multiple possibilities they offer. Then, when we consider the mentioned imprevisibility, we notice the indissociability among the various formative processes originated in these nets. By contrast, there is the impossibility to spot precisely how a life experience is connected to a previous one, meaning to spot "[...] the origin of different actions we perform because of the manners we comprehend the world" (OLIVEIRA, 2012, p. 168).

When we get closer to the mentioned articulation, we will break up with the idea that knowledge construction is a tree used as a metaphor.

Picture 1. Arboreal Perspective



Source: Gallo (2001, p. 23)

For Oliveira, this idea (tree) works with a linear proposal of knowledge since it assumes successions and sequencing (based on steps). This is a notion that operates with knowing the tree is ready, finished and, it is the learner's chore to access it. This way, the exterior action is considered a founding element of knowledge acquisition. That is why the traditional modern pedagogy centers its action on the professor.

On the other side, Knowledge Network notion founds its proposal on the idea that information – "values, experiences, formal knowledge, beliefs, convictions, emotions, sensations, feelings" (OLIVEIRA, 2012, p. 69) – reach the subjects and only

turn into knowledge when articulated to threads already woven in individual net. Hence the idea of a meaningful learning as Freire (1997) has taught us since the information gets its own meaning and not the one the conveyor means.

This way, we go back to the previous discussion to emphasize the idea of imprevisibility. If there is a singular construction (of each subject) and it is particularized for their subjectivity net, it will not mean that it makes sense to assume the existence of a single path to be taken, as if there were a single learning method.

In this line of thought, it happens the meeting between the Knowledge Network and the Principle of Recursion. Hence, according to Morin (2003, p. 182), the Principle of Recursion "[...] is the organization whose effects and products are necessary to its own causation and production". To Oliveira (2012), all the knowledge is collectively woven:

> [...] because it is meshed to the pre-existing in the society, it is modified and, necessarily, **product and producer social processes** since it is the cover of different interaction between the subjects that weave and create their own nets and the other nets of *knowledge-action* if which are interacting. (OLIVEIRA, 2012, p. 70).

Likewise, when we admit this, we understand that society is an uninterrupted circle of production among individuals that interact, produce and, simultaneously, are affected by what was produced.

The process of health-sickness is not excluded from the complex relation between cause and effect when it has its conception enhanced to beyond the biological perspective.

In this perspective, the Knowledge Network acquires bigger relevance because it allows us to consider the multiple experiences, beliefs, knowledge, values, and also respect individualities and collectiveness, producing knowledge through daily creation of curriculum.

In this specific study, the virtual discussion (due to Covid-19, via clinic case) offered us closeness to Knowledge Network once the idea sharing, the teasing allowed tensions and conflicts, problematizing that favored the process to build clinic reasoning and enable the practice of laboratory diagnosis.

One of the clinic cases that helped to understand this knowledge network referred to the presentation of a dermatopathology shown by onychomycosis on the hallux finger. Because of this pathology, the request of pre-treatment laboratory exams became necessary. This allowed us to unveil the alterations existing in the liver. However, this path (clinic case) was possible due to comings and goings, via the professor's questioning in the attempt to interpret the exam data and it led to the final diagnosis of liver cirrhosis.

Facing the exposed, it is evident that the collective construction, that happened during the discus-

sions, allowed the students to surface experiences obtained in different practices of the internship (General Practice, Pediatrics, Obstetrics and Gynecology and Surgery among others). Like the knowledge acquired in other modules and the one obtained by individual readings, it enabled them to signify the contents and dialog about the complexity that surrounds the laboratory diagnosis of hepathopaties.

6 METHODOLOGY

Considering the collected data that embodies this paper, we opted for the production of a didactic-pedagogical material: Didactic Sequence (DS). In this sense, a SD is a proposal of intervention in medical education since the material is complementary in the process of **learningteaching** in laboratorial diagnosis of liver diseases.

6.1 Metodology of the Didactic Sequence (DS)

In this study, the DS is interpreted from Leonor *et al.* (2014), once it establishes four dimensions. Firstly, the **Structure and Organization.** The organization of the Didactic Sequence must be objective in its writing, establish the learning time and applying methodology, as well as the relevant explanations for its development: theoretical references.

Secondly, promoting the **Problematization** which is an action that allows the student the development of the learning process. For Leonor et al. (2014), this dimension can provide reflecting and conflict solving:

> Problematizing is offering a contextualized approach about a topic, a condition that arouses the interest of the student who feels challenged to use their knowledge in the attempt to solve well placed problematized situations and building adequate explanations. (LEONOR et al., 2014, p. 71).

The third one comes from **Contents and Concepts**. It is the worry about the logic organization of the contents that allow the students to build concepts through meaningful practices and reach the proposed goals (in each learning unit)

Finally, the **Teaching Methodology and Evaluation,** fundamental moment for the **learningteaching** process, will promote the way how the learning situations will be developed and simultaneously, the evaluation of the goals to be reached with the Didactic Sequence.

Considering the above, methodologically, the proposed DS was built from five complementary movements: first, presential moment for acknowledging the teachinglearning interaction dynamic and the facility (Centro de Doenças Infecciosas (CDI--Secretaria Municipal de Saúde/ Volta Redonda), and the discussion of the first clinic case; second; third, meeting on the digital platform *Teams* for discussing the second clinic case; fourth, the students are sent the third clinic case with flipped class perspective; fifth, digital platform *Teams* meeting for discussing the third clinic case.

6.2 First Moviment

The DS initial movement has two moments: presentation of space and its flowchart; and subsequent case study. This way, the mentioned moviment was thought according to the view of Ba-

tista e Batista (2008), with the intention of drawing attention to the educating approaches that favor the professional practice as axis of learning.

This view aimed to identify the potential motivator of reality inserting, investing in observation and critical questioning that unfolds the formulation of contextualized questions and provides a permanent movement of complex to complex.

In the case of this methodological path, the first movement evolved from the arrival of each team of five students that built the groups of Internship of Collective Health module, as described in the methodology. It is important to point that the studied class was made of six groups and, all the following movements were applied, successively, to them.

On the arrival of the students in the practice field of Centro de Doenças Infecciosas (CDI), the professor researcher presented the physical space and the unit

Later, a management organization chart was presented (administrative, technical and welfare management). After that, a detailed patient flow regulation was presented, from the medical reference issuing at Unidade de Saúde da Atenção Primária (APS), their insertion in the system of regulation (SISREG) until the patient admission while in medical consultation in the unit of medium complexity (APS).

At the second moment – the clinical case – we get closer to the view of Ribeiro *et al*. (2013), when we conceive the service-teaching interaction as extremely important to the future doctor training as stated below:

> [...] whether it is the university or the services, they are constituted as a place for constant debates among the political, ethic and pedagogic choices. It elevates the importance degree of all the actors in the educative process and the determining of the possible ways to be adopted by the health politics and personal training (RIBEIRO et al., 2013, p. 948).

When considering the above, we highlight that the clinical case, discussed at the presential meeting, came true via data that emerged from a patient referring from APS to CDI and they initially related diffuse abdominal pain and Jaundice syndrome. In this way, the approach about laboratory exam requesting and its respective interpretations was possible and the discussion about the dynamic of caring management as well. The outcome of the case was the final diagnosis of acute hepatitis B

6.3 Second Moviment

The second movement came true after electronic messaging of (email and WhatsApp) from the second case clinic to the undergraduates.

6.4 Third Moviment

In the case of the third movement, for its fulfillment, the digital platform *Teams* was adopted because it is the digital via used by the institution to develop the didactic-pedagogical processes during the Covid 9 pandemic.

The meeting on *Teams* platform occurred on the date and time previously agreed between the professor and students. It lasted two and a half hours average respecting the class schedule established by the institution.

The discussion of the second case began with its reading by one of the students and afterwards, it was mediated by the preceptor, through questioning, who stimulated the tessitura of knowledge about the laboratory diagnosis of hepathopaties. It is important to add that the preceptor made a Power Point presentation with the all the relevant data, in order to have an adequate exposition of the data of the clinic and laboratory course.

Likewise, it is important to stress that, with the case clinic exposition presentation, it is possible to contextualize the multidisciplinarity dynamics through the findings of the laboratory alterations. These are valued by the clinic and epidemiologic context beyond the linear view of the cartesian thinking.

Considering the clinic case within this context, the main complaint of the patient – mycosis on the toe – and, sequentially, the laboratory alterations

that were checked during the pre-treatment of the mycosis lesion, the final diagnosis was liver cirrhosis with chronical hepatitis C as etiology, after the evaluation of the general clinic doctor of APS, dermatologist, hematologist and gastroenterologist.

6.5 Fourth Moviment

The fourth movement came true after the electronic delivery (email and WhatsApp) of the third case clinic to the students. It happened via flipped classroom (FIGUEIREDO *et al.*, 2019; VALENTE, 2018).

In this view of thought, Datig and Ruswick (2013) stress that the class timing goes beyond the professor exposing activity since the learning process is developed through experimenting activities in which the students apply the previously acquired knowledge with the supervision and assistance of the professor.

6.6 Fifth Movement

The last, but not least movement is complementary to all the above. It was possible due to the third clinic case in synchronous meeting on the digital platform Teams. The date and time of the meeting was scheduled according to the preceptor and students, and it lasted two hours.

The discussion was motivated by the preceptor, first with the reading the clinic case by one of the students. Then, with the presentation of the rele-

vant data (Power Point), the preceptor mediated the tessitura of knowledge offering the discussion of the concepts, reviewing the contents of previous modules, and learning how to resignify them. Such movement helped to conceive the knowledge of laboratory diagnosis of hepathopaties through re-flexions and sharing.

It is important to stress that, this case patient developed jaundice syndrome, and looked for help at the emergency department. This allowed the stu-dents to exercise the clinic reasoning to be applied in emergency environments as well as throughout the hospitalization.

Based on the laboratory alterations and others found in the propaedeutic arsenal (proposed as conduct for the case under discussion), the students could experience different hypotheses of diagnosis and discuss each one as differential diagnosis pro-posal until the conclusion of the final diagnosis as autoimmune hepatitis and Acute on chronic liver failure (ACLF).

Table 1: Planning the Didactic Sequence (DS)

ACTIVITY	GOALS	STRATEGY	EVALUATION
MOVIMENT 1	- Stimulate critical behavior by formulating contextualized questionings and providing a permanent movement from complex to complex; - Promote working-teaching interaction; - Discuss laboratory exam requests and their respective interpretation to potentialize care management.	- Presentation of the facilities for ambulatory practice and the consultation profile conduct of the unit (specially patients suffering from liver diseases); - Presentation of the organization chart of the unit (management, technic and assistance); - Discussion of the regulation flow of the appointments at the unit; - Presentation and discussion of a clinic case.	Roundtable discussion.
MOVIMENT 2	- Promote the student's access to the class content beforehand.	- Emailing or texting the clinic case to the group of 5 students (flipped classroom).	
MOVIMENT 3	- Present and discuss a real-life clinic case; - Comprehend the laboratory diagnosis via extrahepathic manifestation; -Stablish the relationship among the health cost impacts.	- Virtual environment, TEAMS Platform; - Power Point presentation of the clinic case. - Debate about the clinic case.	Roundtable discussion.
MOVIMENT 4	- Promote the student's access to the class content beforehand.	- Emailing or texting the clinic case to the group of 5 students (flipped classroom).	
MOVIMENT 5	- Promote concept review, revisiting contents learned in other time/space; - Resignification of contents from laboratory findings; -Exercise the clinic reasoning to be applied to environments of emergencies as well as throughout the hospitalization.	- Virtual environment, TEAMS Platform; - Power Point presentation of the clinic case; - Debate about the clinic case.	Roundtable discussion.

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