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TEACHING CRITICAL THINKING SKILLS THROUGH PROBLEM BASED LEARNING

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ABSTRACT

Objective: to comparatively analyze the perception of nursing students from two class groups, regarding the implicit teaching of critical thinking in a Basic Life Support course.

Method: educational intervention with a qualitative approach based on historical-cultural theory. A total of 102 students participated in the study, 52 in the intervention group, who were taught using Problem Based Learning methodology associated with guiding questions, and 50 in the control group, taught only using Problem Based Learning. Data were collected from November 12 to 30 in 2015 at the Federal University of Viçosa, through a sociodemographic questionnaire, an evaluation instrument and semi-structured interviews. The evaluative tool and interviews were explored using Bardin's content analysis.

Results: the course stimulated critical thinking skills in students from both groups. However, the intervention group portrayed more perceptions about the characteristics of a critical thinker. The students in the control group, to which only the Problem Based Learning methodology was applied to, mentioned the acquisition of technical skills. In the intervention group, to which the Problem Based Learning methodology associated with the guiding questions was applied to, the students reported the skills of a critical thinker in addition to the technical skills.

Conclusion: the comparative analysis allows us to conclude that teaching methodologies that stimulate critical thinking become mediators in the development and improvement of higher mental functions in teaching, encompassing cognitive and metacognitive capacities. The study represents contribution and advancement in the scope of nursing teaching, considering that the questions add to the technologies of health education.

DESCRIPTORS: Nursing. Nursing education. Nursing students. Problem-based learning. Teaching

ENSINO DAS HABILIDADES DO PENSAMENTO CRÍTICO POR MEIO DE PROBLEM BASED LEARNING

RESUMO

Objetivo: analisar comparativamente a percepção de estudantes de enfermagem, em duas turmas, sobre o ensino implícito do pensamento crítico em um curso de Suporte Básico de Vida.

Método: intervenção educativa, com abordagem qualitativa, fundamentada na teoria histórico-cultural. Participaram do estudo 102 estudantes, sendo 52 no grupo intervenção, que foram ensinados por meio da metodologia *Problem Based Learning* associada a questões norteadoras, e 50 no grupo controle, ensinados apenas com a *Problem Based Learning*. Os dados foram coletados de 12 a 30 de novembro de 2015, na Universidade Federal de Viçosa, através de questionário sociodemográfico, instrumento avaliativo e entrevistas semiestruturadas. O instrumento avaliativo e as entrevistas foram explorados pela análise de conteúdo de Bardin.

Resultados: o curso mobilizou habilidades de pensamento crítico nos estudantes de ambos os grupos. Contudo, no grupo intervenção, expuseram com mais clareza percepções sobre as características de um pensador crítico. No grupo controle, ao qual foi aplicada apenas a metodologia o *Problem Based Learning*, os estudantes mencionaram aquisição de habilidades técnicas. No grupo intervenção, ao qual foi aplicada a metodologia da *Problem Based Learning* associada às questões norteadoras, além das habilidades técnicas, os estudantes relataram habilidades de um pensador crítico.

Conclusão: a análise comparativa permite concluir que metodologias de ensino mobilizadoras do pensamento crítico se tornam mediadoras no desenvolvimento e aprimoramento das funções mentais superiores no ensino, abarcando capacidades cognitivas e metacognitivas. O estudo representa contribuição e avanço no âmbito do ensino de enfermagem, considerando que as questões somam-se às tecnologias de educação em saúde.

DESCRIPTORES: Enfermagem. Educação em enfermagem. Estudantes de enfermagem. Aprendizagem baseada em problemas. Ensino.

ENSEÑANZA DE LAS HABILIDADES DEL PENSAMIENTO CRÍTICO POR MEDIO DE LA *PROBLEM BASED LEARNING*

RESUMEN

Objetivo: analizar comparativamente la percepción de estudiantes de enfermería, en dos clases, sobre la enseñanza implícita del pensamiento crítico en un curso de soporte básico de vida.

Método: intervención educativa, con abordaje cualitativo, fundamentada en la teoría históricocultural. En el estudio participaron 102 estudiantes, siendo 52 en el grupo de intervención, que fueron enseñados por medio de la metodología del *Problem Based Learning* asociada a cuestiones orientadoras, y 50 en el grupo control, enseñados sólo con el *Problem Based Learning*. Los datos fueron recolectados de 12 a 30 de noviembre de 2015, en la Universidad Federal de Viçosa, a través de cuestionario sociodemográfico, instrumento evaluativo y entrevistas semiestructuradas. El instrumento de evaluación y las entrevistas fueron exploradas por el análisis de contenido de Bardin.

Resultados: el curso movilizó habilidades de pensamiento crítico en los estudiantes de ambos grupos. Sin embargo, en el grupo de intervención, expusieron con más claridad percepciones sobre las características de un pensador crítico. En el grupo control, al que se aplicó sólo la metodología del *Problem Based Learning*, los estudiantes mencionaron la adquisición de habilidades técnicas. En el grupo de intervención, al que se aplicó la metodología del *Problem Based Learning* asociada a las cuestiones orientadoras, además de las habilidades técnicas, los estudiantes relataron habilidades de un pensador crítico.

Conclusión: el análisis comparativo permite concluir que metodologías de enseñanza movilizadoras del pensamiento crítico se vuelven mediadoras en el desarrollo y perfeccionamiento de las funciones mentales superiores en la enseñanza, abarcando capacidades cognitivas y metacognitivas. El estudio representa contribución y avance en el ámbito de la enseñanza de enfermería, considerando que las cuestiones se suman a las tecnologías de educación en salud.

DESCRIPTORES: Enfermería. Educación en enfermería. Estudiantes de enfermería. Aprendizaje basado en problemas. Enseñanza.

INTRODUCTION

The guidelines for national and international university education highlight the need for paradigmatic changes in the teaching, learning and evaluation process, moving from training focused on the transmission of knowledge and memorization to a model based on competence training.¹⁻³

These can be understood as a set of knowledge, skills and attitudes, such as capacity for criticism and reflection, clear communication, application of knowledge to professional practice, understanding of the culture and beliefs of the people, ability to work in teams, humanistic based on ethical, moral, compassion and otherness values, which are indispensable to the current health work scenarios.³⁻⁴

In this context, competency training has a unique importance in health training, by stimulating the development of cognitive and metacognitive psychosocial skills, understood as the ability to evaluate and generate information, make decisions and solve problems. Metacognitive competences are characterized as complex competences, including self-regulation and planning activities. Thus, the Critical Thinking (CT) competence has gained prominence in the area of health and nursing, as it combines together cognitive and metacognitive skills.⁴

The term CT has been used in the literature to indicate the mental processes involved in the ability to judge rationally.⁵ Thus, CT is the way of thinking about any subject, content or problem, applying appropriate skills such as interpretation, evaluation, inference, explanation, and self-assessment.⁵⁻⁸

In nursing and health care, CT represents a fundamental competence in academic and professional actions, in order to link clinical reasoning and effective and secure decision making.^{5,9} For this to occur, there is a need for persistent and organized effort in order to judge clinical situations based on the best evidence, based on the skills of CT.⁵

The stimulus for CT in nursing education is fundamental, considering that there is a tendency to focus on the application of taxonomies, to the detriment of the nexus with the clinical context and the patient's specific needs.¹⁰ Therefore, using appropriate methodological strategies that stimulate the skills of CT become a challenge to the teaching practice. As the present study attempts to do, conducting research comparing teaching methods or methodologies appears to be suitable, which considers CT as a superior mental function achieved within a Zone of Proximal Development (ZPD) or a stimulus to a conscious behavior of the student, as proposed by Vygotsky's Historical-Cultural Theory.¹¹⁻¹⁶

As an indispensable tool for care practice, CT should not be confused with innate capacity, but understood as an ability that can be taught and learned.^{9,11} Studies⁹⁻¹² highlight that these skills can be approached implicitly (in teaching a course / lesson that does not deal directly with the CT) or explicit (in which the topic directly addresses the PC). However, studies have shown that teaching methodology is more important than the explicit or implicit stimulation of CT regardless of approach.¹³⁻¹⁴

Recent meta-analysis⁹ demonstrated the superiority of the Problem Based Learning (PBL) or Problem Based Learning methodology in comparison with other teaching methodologies in relation to CT development. Another study that used the PBL to teach Basic Life Support (BLS) showed an improvement in students' knowledge in the test at the end of the course, as well as the development of clinical skills for decision making.¹⁴

However, it should be emphasized that forms of assimilation and learning are influenced by cultural factors, and validation or refutation of findings of foreign research through replication in other countries should occur.¹⁵ The national and international literature^{9,11-14} has positively highlighted PBL as a methodology for mobilizing CT skills, however, there is still little intervention-type research that replicates or evaluates CT skills in nursing students in Brazil.⁹

In view of this finding, the present study aims to comparatively analyze the perceptions of students from two class groups regarding the implicit teaching of critical thinking in a BLS course.

METHOD

An educational intervention research with a qualitative approach based on Vygotsky's Historical-cultural Theory.¹⁶⁻¹⁷ Educational intervention is understood as a set of teaching activities, based on a theoretical construct, with specific methods, phases and rules aimed at attaining desirable skills and attitudes. Historical-cultural theory establishes that higher mental functions develop through socio-cultural interaction, mediated by signs, such as language (word and gestures) and activity (teaching and learning).¹⁶⁻¹⁷

The participants of the study consisted of 102 undergraduate nursing students of the Federal University of Viçosa, Minas Gerais (Brazil), enrolled between the first and third year of the graduation course. One month before the intervention, the Basic Life Support Course project was presented and authorized by the coordination of the graduation course and, after, was distributed to the students through posters and social networks. After the registration deadline, enrollees were randomly divided into two groups, the intervention group was composed of 52 students and the control group was composed of 50 students. To participate in the course, the students did not necessarily need to participate in the research, and were guaranteed access to all the activities developed.

Students who studied subjects between the first and third year of the undergraduate nursing course were included in the study, giving a total of 262 participants. Those who were on leave or on certified medical leave were excluded from the study.

The educational intervention occurred in November 2015, between the 12th and 30th of November and lasted 15 hours. The issue of BLS for both groups was addressed in both groups. The course was divided in two meetings, the first meeting lasted five hours and the second lasted ten hours. Concurrent activities in both groups were performed by previously trained tutors. On the first day, the Free and Informed Consent Term was read and signed, the sociodemographic questionnaire was applied and the PBL methodology was clarified step by step. On the second day, the theme was developed through PBL.

Initially, random selection was used to divide the class into small groups of eight to ten students, each subgroup being under the guidance of a tutor. In order to implement the PBL, Berbel's proposal was developed in seven phases: 1) reading a clinical case on the subject; 2) problem identification, 3) hypothesis formulation; 4) summary of the hypotheses; 5) formulation of learning objectives; 6) study on the subject and 7) return to the group for presentation of results and discussion.

However, in the context of the comparative analysis of learning and evaluation of CT skills, guiding questions (Table 1) based on the Delphy Report⁷ were used in phase two of PBL in order to stimulate and direct thinking. Thus, the students in the intervention group needed to analyze the clinical case according to the guiding questions that were intended to implicitly stimulate CT. As there was no introduction of the guiding questions, the students in the control group were asked to explain what they considered correct or incorrect in that case. Before the intervention, these questions were adjusted and validated by three CT research specialists, two of them were national specialists and one was international.

As a hypothesis of the study it was established that: students who participated in the educational intervention on BLS, based on PBL guided by guiding questions (intervention group), would be more stimulated for CT abilities, when compared to the students of the control group.

Table 1 - Guiding questions to stimulate critical thinking (CT) skills

CT Skills	Guiding questions
Interpretation	How do I interpret this situation? What knowledge do I need to understand this situation?
Analyze	What information is relevant for me to understand this situation part by part? Is there logic / meaning in the actions?
Evaluation	What information can be grouped to identify a problem? Are there strengths and weaknesses in actions?
Inference	What are the problems identified and which are the priorities that require interventions? To what conclusions could I arrive at in relation to the problems?
Explanation	Based on the identified problems, how should the actions be planned? How would you act in this situation?
Self-evaluation	What is the most coherent and objective way for me to act in this situation? Are my judgments about actions rational or influenced by prejudices?

Source: Adapted from Facione^{2,6}

A sociodemographic questionnaire, semi-structured interviews and an evaluation instrument were used for data collection. The sociodemographic questionnaire, which included questions about sex, age and academic year, was applied on the first day of the course. The evaluation instrument was delivered at the last meeting and was composed of the following questions which students needed to answer: how did I start the Course? What did I learn in the Course? How am I leaving the Course? The interviews lasted an average of 15 minutes and were carried out after completion of all activities by the principal investigator with students who accepted to participate, being guided by the following questions: do you believe that this course interfered in the process of critical thinking? In what way, in what moments or situations? What is critical thinking for you ?

The material collected in the interviews (recorded on a digital recorder) and in the evaluation instruments was transcribed in its entirety and was organized separately and stored on digital media. The interviews were performed until the frequent repetition of the manifest content in the statements (data saturation) was noticed, at which point the inclusion of new data no longer changed the researched content. All 102 evaluative instruments of the participants were included in the study.

To analyze the data, the content analysis technique¹⁹ was applied in three phases: pre-analysis,

material exploration and treatment of results, inference and interpretation. The objective of the pre-analysis was to operationalize and systematize the initial ideas, trying to comprehend the text comprehensively and forming a *corpus* analysis. The exploration of the material and the treatment of the results gathered elements of the *corpus* with common characteristics. They were subsequently organized through rules of counting, classification and aggregation, delimiting the categories. In the inference and interpretation phase, the information was summarized and distinguished for analysis and critical interpretation of the results, according to the proposed objectives and the theoretical framework.

In order to guarantee anonymity of the interviewees, alphanumeric coding was used with the initial "E", representing interview, and ordinal numbers according to the order of the interviews in each group, followed by the initial "Ct" for control group or "In" for the intervention group.

The research was initiated after the approval from the Committee of Ethics in Research with Human Beings of the Federal University of Viçosa, under Certificate of Presentation for Ethical Appreciation (CAAE) N. 45536215.9.3001.5153 and opinion N. 1,321,946.

It should be noted that this study is linked to the *Red Iberoamericana de Investigación en Educación en Enfermería* (RIIEE), through a multicentric research project entitled "*Desarrollo del pensamiento crítico en los estudiantes de enfermería: situación de Iberoamérica*" and

represents the implementation phase and evaluation of the PBL methodology in nursing teaching in Brazil.

RESULTS

The majority of the 102 participants in the study were women (n=87; 85.3%), with a mean age of 22 years. Regarding the academic semester in the Nursing Course, the majority (n=58; 56.9%) was between the fifth and seventh semester 28 students participated in the semi structured interview, 14 from the intervention group and 14 from the control group. Based on the analysis of the 28 interviews and 102 evaluation instruments, the inferential interpretation of the content was performed, resulting in four categories: Problem Based Learning as a propeller for critical thinking; teaching strategy in the process of critical thinking; perception about Critical Thinking; and evaluation of the lived experience: how I started and how I'm leaving the course.

Problem Based Learning as a propeller for critical thinking

Understanding the critical skills of a critical thinker is fundamental. Students' understanding of these skills, such as analysis, assessment and self-assessment, can be identified in the speeches of the intervention group:

the course led me to think beyond, to see the question as a whole, to analyze beforehand, without judgments, to listen to the opinion of others (E12In).

I could think of things I had never thought of before, analyzing before, planning, self-evaluating myself, to act in sequence (E24In).

For the control group, the skills of a critical thinker are related to the organization of actions and analysis:

I improved my critical ability, learning to organize my actions, seeking the correct way of acting, thinking, analyzing and then acting (E28Ct).

I need to analyze before and understand everything that is being done so that errors are minimized (E14Ct).

Thus, the students believe that the course helped in the understanding and organization of thoughts, to know how to act in an appropriate way. However, because it was a BLS course, requiring rapid decision-making, students from both groups pointed out the agile and intuitive response as complicating for a beginner critical thinker:

to attend urgent and emergency cases, we have to think fast and think about the best care, but this can

be difficult for a beginner. To think critically there, you know? (E11In)

in many situations, the course required readiness, but for me, still as an apprentice, I had to calmly analyze in order to give an answer (E17Ct).

It can be seen from the previous statement that the specificities of each student, their rhythm and time of learning must be taken into account. On the other hand both groups of students believe that the course, based on the search for solutions, has made a repertoire of attitudes and abilities intermediated by critical thinking possible:

before the course, if I were in an emergency situation, I would act more for emotionally, but today, after having participated in the course, I see that, even quickly, you have to evaluate everything reflexively, define responsibilities, think about your safety before making decisions (E26Ct).

the course instigated to question and to have critical thought about our decision making, interaction with other professionals, defining assignments [...] (E24In).

The statements demonstrate that the course, combined with the methodology developed, made fundamental technical and cognitive acquisitions possible for a critical thinker who acts in emergency situations.

Teaching strategy in the Critical Thinking process

Teaching strategies that foster interaction between the teacher and student parties trigger the motivational expectation and allow students to share their past experiences, question what is being presented, and reformulate conceptions through the teacher. The following statements represent the above, and the stimulation of the questioning in the intervention group is highlighted:

[...] yes, with the approach method, I reasoned critically, because it was necessary to analyze, to obtain the relevant data in order to decide on the correct conduct (E10In).

the realization of the course, together with the preceptors, intrigued us to question about our decision-making, interaction with other professionals, define assignments, manage first aid (E24In).

[...] will assist in the organization of my future actions faced with certain urgent situations, decision making and intervention (E28Ct).

the methodology has left the traditional context, where the teacher is the holder of knowledge and the students are only recipients (E03Ct).

Overall, the students of the intervention group believe that the methodology applied in the course, PBL associated with the guiding questions, assisted in the learning process and stimulated CT skills, which can be detected in the statements of the intervention group:

in the clinical case, guiding questions also led us to think about several issues surrounding the problem situation, to think critically, to reason to discuss in groups and to see the opinion of each group and to arrive at a better and more comprehensive action (E18In).

the strategies directed the reasoning. These are less monotonous forms of teaching and, I believe that the interaction among colleagues favors critical thinking, since the class was composed of students from different semesters, which led to discussion about certain situations from different perspectives (E05In).

Perception of Critical Thinking

In addition to the characteristics of a critical thinker, it is essential to understand how to use the skills in academic and professional life. Therefore, students in the intervention group understood using their own judgments that:

[...] critical thinking, for me, is the ability to analyze, judge and make the most pertinent decision regarding the clinical situation in front of me (E10In).

[...] it is you analyzing something logically, having a concrete thought about something. Analyze to make an appropriate decision in case of a patient (E24In).

Students in the control group believe that:

[...] is to be less intuitive and more open to options, views, performing more concise evaluations (E07Ct).

[...] critical thinking, for me, is not passively accepting things as they are presented, but opening the mind to other possibilities, other points of view (E19Ct).

We can see from the statements of the intervention group that the conceptual understanding that the CT is to analyze, judge and then make a clinical decision.

In the control group, they believe that it is to analyze points of view, options and evaluate, correlating with daily facts of life and not only in the clinical scope. In contrast to previous statements, some students from both groups associated CT with reflexive thinking, including:

for me, critical thinking is to be able to reflect from the observed evidences, using techniques for the formation of opinion (E21In).

is to think in a reflexive way, to have a different look and to give greater attention to something that is given to us to question and to be analyzed (E27Ct).

Evaluation of the lived experience: how I started and how I am leaving the course

The qualitative evaluation of the educational activities expresses the meanings of the teaching and learning process, allowing to qualify it and adjust it when necessary. Regarding the way they started the course, bringing the knowledge of daily life and the disciplines already taken, the following statements express expectations, hesitations and natural insecurities to a relevant content in both groups:

at the beginning of the course, I had little knowledge and I was insecure that is to say, the knowledge that I had would be insufficient to act in such situations (E11In).

when I entered ... I confess that I was afraid that I would not be able to keep up with the progress of the activities and lose myself with the information and my lack of knowledge (E09Ct).

Students in both groups reported starting the course feeling afraid and insecure. However, as the activities and interactions unfolded, students were re-signifying and learning the content. Regarding the control group, they mention orientation by guiding questions:

I was able to improve the practice and deepen theoretical scientific knowledge. One point that caught my attention was the day the class was subdivided for discussion and resolution of a clinical case of attending a cardiac arrest, with guiding questions (E24In).

the class was divided, forming some groups for the discussion of a clinical case, guided by questions. I was feeling safer than I did the first day. Group production was very useful for understanding and exchanging information (E10In).

The students who participated in the activities in the control group report: I left this second day with a clearer vision, feeling more secure of my actions, knowing to perform cardiopulmonary resuscitation (E22Ct).

[...] it allowed me to get to know the theme better, to break some fears, to exceed expectations and to value the professionals of the area even more and to work as a team (E02Ct).

At the end of the course, the interviewees of the two groups mentioned the acquisition of technical skills in the assistance in SBV. However, in the intervention group, besides the technique, specific skills of a critical thinker are mentioned:

I am leaving as a more reflexive person and able to process what happened and at the same time able to act on theoretical scientific knowledge and not only on emotion, but with the reason to give better care (E18In).

[...] *with the capacity to think in emergency and emergency situations, assessing the patient's situation more clearly, working with more knowledge and tranquility, and providing better care for the victim* (E12In).

the course was very important to gain knowledge, because until then, I had no notion of how to act in situations of accidents with victims (E03Ct).

it was a course that is now part of my repertoire and gave me support to be a person able to provide immediate care (E01Ct).

From the statements, it is noticed that both groups of the students gained added experiences, reflections and knowledge that will be added to their academic and professional life.

DISCUSSION

From the general analysis of the results, it can be understood that the course stimulated CT skills in the students from both groups, regardless of the age, semester or sex of the participants. However, the participants in the intervention group perceived the characteristics of a critical thinker more clearly, such as: ability to analyze without prejudice, understand points of view, organize and evaluate actions, and then establish interventions. These conceptions are similar to what is described in the national and international nursing literature.^{5, 15,20,21}

In a more general concept, in the various areas of knowledge beyond health, such as psychology, philosophy, education, the critical thinker has been reported as an individual who analyzes, judges in an intentional, reflective manner and who always seeks truth impartially and weighted values.^{5,7} In nursing, it has been defined as someone with the capacity to employ the highest cognitive abilities to analyze, question, evaluate, conceptualize and understand clinical problems in a more precise, logical and adequate way.⁸

However, there is still some divergence related to this concept. Thus, due to the lack of consensus in general and nursing literature, mainly in Latin America, a research was carried out through the concept analysis method on the most frequent skills and dispositions in a critical thinker. According to the authors, the most frequent abilities were: analysis, evaluation, inference, rational examination, interpretation and self-regulation.⁵

Considering these CT skills which are corroborated in the students' statements, it is inferred that the conceptions and concepts described here define an ideal critical thinker. However, in the human and professional development process, these attributes,

if not consciously worked on, will not always be achieved.^{5,22} Therefore, it is necessary for the professional or nursing students to seek the improvement of the cognitive and affective aspects of CT in a careful, rational, active and constant manner, and become good critical thinkers in the performance of their activities.^{9,20}

When possible this search should be mediated by practice, so that internalization occurs in a process of reconstitution and reconstruction of what is desired, as in the case of this study, in order to develop CT in a BLS course. Such a conception is based on the historical-cultural theory, which says that thought formation, concepts, cognition and affection are developed in the internalization of theoretical content through practical activities.^{16,23}

The contents and activities of the course were organized in order to involve students from different semesters in order to stimulate knowledge through interaction. Although the content was prepared for layperson learning and conducted in groups, some students reported difficulties in performing BLS activities, which require readiness, with thinking critically and then making decisions. Others believe that the course stimulated and mobilized their intellectual ability to CT.

This demonstrates the need to teach according to the specificities of each person, to work with self-confidence, allowing it to be repeated several times when necessary for the purpose direction of improvement.²¹ On the other hand, it is up to the teacher to, intentionally stimulate CT with pedagogical action during the training process. This dialectical movement aims to reach the essence of the phenomenon that is taught and studied.²⁴ In this process, the teaching pedagogical action, as it helps others to educate themselves to be able to act critically and actively in the world, also modifies the author of the action.

In the present study, the use of PBL stimulated the construction of group knowledge through sharing and the appropriation of meanings. When associated with guiding questions, the PBL stimulated the ability to analyze, reason and produce strategies for safe care action, which demonstrates intellectual stimulation for CT.

Research has shown that PBL allows a critical immersion of the individual in the learning process.^{9,13,21} Similar to the findings of this research, a qualitative study²⁵ conducted in Indonesia divided a group of 73 students into two groups: one applied PBL and the other, applied the PBL to research group (GI). In the latter, students were encouraged

to plan, make and display the stages of learning. The authors concluded that the PBL, associated with the GI, stimulated the students' CT by planning, argumentation, and problem-solving.²⁵

From this perspective, it is inferred that PBL, in both groups of this study, acted on higher mental functions and, when associated with guiding questions, in the intervention group, it increased certain abilities or abilities, such as analysis, analyticity, planning and decision. Higher mental functions, such as thought, language, the production of meanings, memory, planning, among others, are developmental acquisitions mediated by the interaction between individuals in daily life.¹⁶⁻¹⁷ According to Vygotsky,¹⁷ through interaction with more experienced people, one can transpose the ZPD. It is the distance between the actual level of development, i.e., the current level, where you can solve problems independently, and the level of potential development, marked by the ability to solve problems with the help of someone more experienced, such as teacher, classmates.

Considering CT as the ability or a set of skills that can be acquired through learning and practice, students were asked about personal perceptions about this ability.^{9,11} There was the understanding that CT is a thought for purpose of evaluating, analyzing, and correctly judging a case or situation.

On the other hand, some students, both in the intervention group and in the control group, referred to the CT as reflective thinking that, although related, is distinct from CT, and is also used in some works as synonyms.²⁶⁻²⁷ It is possible that this difficulty is related to the fact that some authors consider reflective thinking as an ability of the critical thinker, a precursor that can lead to CT.⁵ But there is a consensus in the nursing literature that CT is a cognitive ability that involves a process of analysis, logical reasoning in order to establish a clinical judgment.^{5,8,10}

Studies indicate that the possible consequences of CT application in nursing care are taken from accurate clinical decision and reach effective results in the interventions, determining greater satisfaction in users and nurses.^{5,8,10,13} Regarding students' perception in the evaluative instrument, they reported that, prior to the course, besides insecurity and fear they had a poor understanding of the conducts in the BLS. During the course through the lived experiences the fears were overcome, mainly due to the activities of experience exchange. It should be noted that the intervention group emphasized the action of the guiding questions associated with the PBL,

as an inducer of the technical and specific skills of a critical thinker. In the end, in the evaluation of the course, in spite of natural insecurities presented before and during the course, the participants of the two groups reported greater mastery over the emergency situations, were able to evaluate, reason establish priorities and make appropriate decisions.

This result finds support in the historical-cultural theory that says that it is not any teaching that determines the development and the learning. In this perspective, the most useful learning is one that allows interaction and advances in development, through clear definitions of activities (organization of teaching) and learning activities (means for appropriation of knowledge).¹⁶⁻¹⁷

In an intentional way, the course was organized based on the theoretical assumptions of the historical-cultural theory,¹⁵⁻¹⁶ involving students from different semesters (with varying levels of knowledge), excluding those who had already had contact with content (eighth, ninth and tenth semesters of the course). Thus, there was a joint construction of knowledge from the experience exchange activity, group studies, interaction between classmates and teacher's pedagogical action. This was expressed in the statements of the participants and allowed a balanced leveling in the learning of the addressed contents confirming the premise that interaction in the educational process is essential to development.

Therefore, it is believed that teaching activities should not be limited to the assimilation of content with a view to achieving only skills and attitudes, but to promote the capacity of critical thinking, and the search for knowledge in a joint and planned way.²⁸⁻³⁰ Thereby fostering the development of special abilities, such as clinical reasoning, and the improvement of students' intellectual and affective standards.

In nursing, the activity of teaching and learning, permeated by critical thinking, will have a decisive impact on the training of a qualified professional, rejecting productions of alienated and alienating care. It is concluded that, as the nurse progresses in the dimensions of the CT, the greater the professional satisfaction, autonomy and assertiveness, as well as the safe provision of care to the users.^{5,8,10,29-31}

CONCLUSION

When comparatively analyzing the students' perceptions from two class groups, regarding the

implicit teaching of CT in a BLS course, this study showed that the students' perceptions about critical thinking in both groups were similar.

However, in the intervention group, where guiding questions were used for CT conceptualization and understanding occurred in broader manner. Thus, they highlighted that a critical thinker has the capacity to analyze, evaluate, reflect, organize and then intervene. With regard to the previous knowledge there were reports of limited knowledge and insecurity in both groups.

As the course unfolded and the experiences were exchanged, knowledge was gradually being formed, which allowed to evaluate, reason, and to establish priorities to make appropriate decisions. The students of the control group mentioned acquisition of technical skills, while those of the intervention group, besides the technical skills, reported the induction of skills of a critical thinker. There was mention of the PBL associated to guiding questions as a methodology to stimulate the skills of the CT.

Thus, teaching methodologies of CT, such as the PBL associated with guiding questions, become fundamental mediators in the development and improvement of the higher mental functions in the nursing graduation courses. These functions encompass cognitive and metacognitive abilities, which together improve the capacity for analysis, evaluation, inference, rationality, interpretation, and self-regulation. These capabilities will enable accurate examination of clinical situations and allow nurses to perform accurate decision-making in their actions.

In view of the results, it is concluded that the study represents contribution and progress to nursing education, considering that the guiding questions for the development of CT add to the technologies of health education. The short period of time of the course and the fact that the research was carried out with students from a single institution, are both considered limitations of the study. New qualitative and quantitative educational intervention investigations are recommended, which explicitly teach CT which have a longer duration and bring undergraduate nursing students from various institutions together.

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