Tactical Commander's Critical Thinking and Decision Making: Participant Observation From Students[1]

O Pensamento Crítico e o Processo Decisório do Comandante Tático: Observações Participantes Discentes

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ABSTRACT

This paper aims to analyze the development of critical thinking in the current process of learning tactical themes in the Army Command and General Staff College. Therefore, this study was exploratory and had a qualitative and quantitative approach. The fieldwork was conducted through two techniques: participant observation and survey. The sampling technique included 117 subjects, students in the Advanced Military Studies program. In summary, it was found that the Critical Thinking development process in the School lacks systematization in the classroom. On the other hand, there are capabilities that allow its development, as seen in field exercises. Part of it is due to the "grade" culture. The students feel discouraged from using their creativity since they are worried that it could take from their grades. Thus, they tend to prefer solutions that guarantee good performance in formal assessments. Finally, studies to verify the perception of the instructors are recommended, so that they would acquire tools for the development of Critical Thinking and evaluate how much workload should be assigned to tactical issues in school.

Keywords: Army Command and General Staff College. Analysis of the Situation of The Tactical Commander. Critical Thinking.

RESUMO

O trabalho tem como objetivo geral analisar o desenvolvimento do pensamento crítico no atual processo de aprendizagem de temas táticos na Escola de Comando e Estado-Maior do Exército. Para tanto, este estudo foi exploratório e utilizou, em seu delineamento, uma abordagem quali-quantitativa. O trabalho de campo foi realizado por meio de duas técnicas: a observação participante e o levantamento. A técnica de amostragem foi por tipicidade, contando com 117 indivíduos, alunos do Curso de Altos Estudos Militares. Em síntese, verificou-se que o processo de desenvolvimento do Pensamento Crítico na Escola carece de sistematização e de fomento na sala de aula. Ainda assim, observaram-se potencialidades que permitem seu estímulo, como ocorre nos exercícios no terreno. Parte disso se deve à "cultura do grau". O aluno tem receio de exercitar sua criatividade por imaginar que isso pode prejudicar sua nota no Curso. Assim, tende a cristalizar soluções que lhe garantam um bom desempenho na avaliação formal. Por fim, recomenda-se a realização de estudos que verifiquem a percepção dos instrutores, que adequem ferramentas para o desenvolvimento do Pensamento Crítico e que permitam avaliar o quanto de carga-horária se deve destinar a temas táticos na Escola.

Palavras-chave: Escola de Comando e Estado-Maior do Exército. Exame de Situação do Comandante Tático. Pensamento Crítico.

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1 INTRODUCTION

The nature of war has changed since the end of the cold war. Currently, armed conflicts are characterized by diffuse, changeable, asymmetrical and complex aspects (VISACRO, 2009). The revolution in communication further deepened these uncertainties.

Such characteristics became so relevant that those nation States that used to be regarded as enemies are not seem as main threats to the sense of security any more, but any players acting to destabilize peace, order (International, regional and national) and the well-being of the human race are seen instead.

According to Manwaring (2011), such players include, in addition to States, such hegemonic non-State organizations (insurgents, transnational criminal organizations, terrorists), as well as those agents seen as responsible for a number of indirect threats to human security (poverty, social exclusion, environmental degradation).

This unstable environment, as Allen and Gerras (2010, p. 32) say, requires commanders and advisors who "need to learn quickly, adapt as needed, predict the future, be mentally agile and versatile, and able to assess issues under certain contexts". To this end, the authors postulate that these leaders should develop critical thinking skills[3].

In this study, the concept of competences converge to Perrenoud thinking (2000, p. 15), i.e. the "ability to mobilize various cognitive resources to face [...] situations", going beyond knowledge or attitudes and through schemes of thought that enable you to determine the problem, orchestrate resources and implement actions adapted to problem situations.

Considering that the Army Command and General Staff College (ECEME) is the Brazilian Army educational establishment in charge of training officers to perform tactical commanding duties, as well as their assistant, in this unstable environment, this paper presents the following central question: is the current ECEME tactical issues teaching process managing to encourage the development of Critical Thinking among their graduates?

The research has the following specific objectives:

- Study, by means of bibliographical research, the Critical Thinking applied to the decision-making process by the Brazilian Army tactical commander.
- Collect data on the development of critical thinking skills based on the perception of ECEME officer-students.
- Conclude on the development of such skills in ECEME tactical issues.

3 Its definition is discussed in Section 3.

2 METHODOLOGICAL PROCEDURES

The present study was exploratory and employed in its outline a qualitative and quantitative approach, based on the understanding of the interrelationships that emerge from a given context (ALVES-MAZZOTTI; GEWANDSZNAJDER, 1998). In this case, the approach included the interrelationships between the learning process of the situation by the tactical commander and the development of Critical Thinking skills.

Although "Critical Thinking" is the central theme, the epistemology employed was not that of the Critical School. According to Raibolt (2010), Critical Thinking presents neither direct nor intentional relations with the Frankfurt School critical theory. In turn, McLaren and Gutierrez (2000, p. 195) postulated that critical theory is not equivalent to Critical Thinking, since the Critical School is characterized by "something different from the connotation given by approaches that are psychologically based on problem solving", particularly in the arena of ideological and material contestation.

In view of the new skills demanded by contemporary conflicts, a pluralistic epistemology is now very valued, according to Morin (2009), seeing that military problems are now multidimensional and cross-cutting; therefore, the military coming from ECEME should critically articulate, reconnect and contextualize knowledge as well as be within the context and orchestrate their resources to solve problems.

In this context, the inductive method was adopted, as discussed by Lakatos and Marconi (2003), to observe, relate and generalize that which is dealt with by the literature on Critical Thinking applied to Military Science including a perception of how such skills have been developed at ECEME. The work is still descriptive and is not intended to be comprehensive. On the contrary, it seeks merely to encourage readers to go further with the research on the theme.

Student perception was considered to be significant as it may subsidize the educational process in military schools, because, as discussed by Freire (1996, p. 30), "why not to discuss with students the concrete reality they should associate with the discipline they are being taught?". There is no teaching without students.

It is well known, however, that what happens in a school goes far beyond the result of the student's daily life (ANDRÉ, 2008). Therefore, we suggest future researches contemplating the teaching perception, so as to enhance the understanding of those interrelationships referred to by Alves-Mazzotti and Gewandsznajder (1998) in this section, that is, ECEME teaching-learning relations.

As for procedures, according to Gil's classification (1999), the study was bibliographic, documentary and carried out in the field. Bibliographic and documentary

studies were triggered by the analysis of contents of books, scientific papers, essays, field manuals, school documents and informational material from ECEME database. It was systematized as follows: location of sources and material gathering; reading; book report, and categorization; and logical organization of the subject.

The field work was carried out by employing two techniques: participant observation and survey.

Participant observation is due to the fact that the researcher was part of the study group (GIL, 1999). Being part of the group, it was easier to access data and understand contingency situations. Therefore, the risk of performing analyzes based on pre-established concepts was assumed. Nevertheless, Noronha's thoughts (2008, 140), by which some authors, using this perspective, reject any link to (neo)positivist epistemology and fight scientism with "spontaneist" postures. By adopting a plural approach, we decided to conduct a survey to corroborate the inferences from participant observation.

Questionnaires were applied in the survey including semi structured scripts, and nonparametric statistics tools were used for tabulation, coding and analysis. The questions were formulated according to participant observation.

The sampling technique was defined by type[4], by selecting the number of students from the 1st year of the 2013's High Military Studies Course as a typical sample for the survey seeing that the participant subjects attending under the current ECEME teaching methodology, 117 questionnaires were completed.

For the purposes of the analysis, closed questions in the questionnaire were based on the quantifying devices of the scales that measure both attitude and opinion (MATOS, 2004). Data was coded, tabulated and submitted to significance statistical tests, where the rule for decision was: if $p[X^2c > X^2a] < 0,05$, then there is a significant difference. Chi Square Test and Kruskal Wallis[5] test were used.

The Chi Square test was used to compare the count frequency data (MATOS, 2004), particularly in questions 1 and 4. The Kruskal Wallis test was used to analyze ordinal variables data (MARTINS, 2005) in questions 2 and 3. Correlations were also made among survey questions, seeking to infer such aspects that were not objectively asked.

Despite resorting to statistical models, the paper was also qualitative, since the findings from the field survey with the theory were elucidated through the reflection and interpretation of both information and statistical inferences.

3 CRITICAL THINKING APPLIED TO DECISION MAKING PROCESS

One of the first conceptions about Critical Thinking[6] applied to Military Sciences has existed since the 1940s, developed by psychologists Goodwin Watson and Edward Glaser[7] (FISHER; SPIKER; RIEDEL, 2008; 2009).

In 1990, the American Philosophy Association (APA) sent an inquiry to 46 experts by using the Delphi methodology with the purpose of conceptualizing Critical Thinking. Polysemic results included:

> ability to use logics and reasoning; power to make judgments; ability of questioning and reflection; metacognitive interaction activity; a kind of mental process; a type of intentional process (FISHER; SPIKER; RIEDEL, 2009).

Putting these views together, we see they are aligned with the conceptualization proposed by Allen and Gerras (2010, p. 32), namely

> the ability to provide a creative and holistic overview of the main factors that affect an organization and its environment in order to obtain a sustainable competitive advantage and long-term success.

The application of this ability is deliberately and purposely limited in time, directed by stimuli and abiding by a specific context, where data is conflicting, messy, uncertain and complex. It also refers to the ability to correctly assess the arguments proposed by others and build solid arguments (RAINBOLT, 2010). It has as a function to serve other cognitive tasks, such as decision making and problem solving (FISHER; SPIKER; RIEDEL, 2008).

In the military field, the interest in promoting Critical Thinking related skills has increased since the end of the Cold War. Decision-making on the battlefield is not an isolated fact: decisions are made in a very challenging environment (FISHER; SPIKER; RIEDEL, 2008; SHADRICK; LUSSIER, 2004).

According to Fisher, Spiker and Riedel (2009), it is a necessary skill as far as information manipulation is concerned, so important in modern wars[8], especially when information is diffuse and not controllable.

Therefore, a battalion commander engaged in a

4 Consists in selecting a subset of the population that, based on available information, can be considered representative (GIL, 1999).

5 p [$X^2c > X^2a$] is the probability of rejecting a hypothesis when it is true.

6 Seeking its definition as applied to Brazilian reality, a search on Scielo Brazil basis carried out in November 3, 2013 found only ten articles, three of which in a foreign language. On that same date, a search on the Brazilian Army Integrated Libraries Network (Pergamum Network) returned only three publications.

7 Since then it has become an effective field of study, so that in 2009, the search for the key work "critical thinking" in the United States of America returned 600 occurrences in specialized US locators, becoming a construct of interest for Philosophy, Education and Psychology (FISHER; SPIKER; RIEDEL, 2008; 2009).

8 according to MEI (2013). Component Force Task Commander, Army Division, Brigade, Battalion, Regiment or Group.

peace mission or peacekeeping operations, an operations officer in a jungle brigade carrying out operations against cross-border crime, or an intelligence officer of an army division in a law and order enforcement operation must, in the current threat scenario, develop, advise and decide on creative, multidimensional (holistic) and sustainable action lines. Thus, their decision making process should allow such for skill.

The decision-making process of a tactical commander[9] should comprise an examination of the situation. For Sturari (1993), probably the most important decision-making process of a commander is the examination of the situation, proposed to solve tactical problems, which requires reasoning and judgments by the entire General Staff.

Such examination is a process that generates knowledge, analysis and assessments of decision factors (mission, enemy, terrain and weather, media, time and civil considerations), whose purpose is to allow the common officer[10] to properly outline their actions. Understanding this is a "complex mental process surrounded by subjectivities, (where) the human brain still is, and will be for a long time, irreplaceable" (STURARI, 1993, p. 176).

According to Fisher, Spiker and Riedel (2009), if knowledge of the situation is a crucial part for of the decision making, Critical Thinking is precisely the engine that drives it: it is not only important, but also emblematic.

The Examination of the Situation is the process that will identify the doctrinal solution that will fit the problem. Based on that, Critical Thinking will verify if the solution is appropriate because of the information and surveys that go beyond the analysis of opposing lines of action, which can determine a unique solution, even not doctrinal, that will be best applicable to the actual situation (COHEN et al. apud FISHER; SPIKER; RIEDEL, 2009).

Development it is, therefore, essential for holding commanding positions, since they are the actual decision makers and their advisors, as they synthesize large amounts of information from various sources to feed the work of the commander. All this with the urgency of time.

In such situations of limited time in conjunction with extreme pressure and stress, the ideal skills development, according Shadrick and Lussier (2004) is to stimulate the official "how to think" rather than "what" thinking, enabling -the make decisions when situations deviate from the expected.

In fact, when this author attended his upgrading course in the US Army, this urgency was detected. At the time, we reported as follows:

> The methodology of the course aims to teach 'how to think' rather than 'what to think.' There is no in-house solution and there is not 'a solution'. The most important thing is to follow the decision-making method, abiding by the principles of war and the fundamentals of military operations (ALMEIDA JR; MATOS, 2009, p. 18).

Convergently, Sturari (1993, p. 169) understands that:

> The method doesn't have necessarily to lead to those decisions recommended as exemplary in the manuals. This is a very common form of prevention that has hindered the development of the doctrine.

Corroborating this thought, Fisher; Spiker and Riedel (2009) state that the normative and procedural nature of the doctrinal methods may actually discourage the implementation of thinking skills, thereby inhibiting the creation of new solutions.

In this context, the weights proposed by Williams (2013, p. 50-51, our translation) are considered to be challenging:

> The Army's doctrine of situation examination favors Critical Thinking and enables us to be Orthodox if the situation allows. (...) The officers should be able to formulate and advocate original hypotheses; even if this goes against the published doctrine (...) The decision-making process requires us to do more than allow small heresies. It demands us to make up 'heretics'
> – leaders capable of challenging conventions to generate imaginative solutions according to the operating environment.

Such thoughts are challenging because of the organizational culture of the most armies: in general, according to Sturari (1993), military training has a Cartesian origin. This grows in importance because skills development in Critical Thinking challenges doctrinal conventions. As Guzmán et al (2014) stats, challenges of this nature detached from a receptive organizational culture may result in merely partial changes rather than in effective changes.

Corroborating this, Sturari (1993, p. 169) states that: "modern administration, however, identified distortions in the discriminate use of Cartesianism and, in this context, our situation study [examination] can be referred to as an example." The author comes to the conclusion that situation analysis should be enriched by dialectical stages, based on holistic approach, due to the evolution of the knowledge age in all áreas11.

Cartesianism in Situation Examination reflects algorithmic approaches in different situations, which will not tend to reingorce dynamic and creative approaches (FISHER; SPIKER; RIEDEL, 2008). What is the best area for a Command Post? Usually an officer adds up to the points according to location factors

9 Not characterized by military genius.

10 This observation provided by the author became noticeable in the past century, before the advent of social media that enhance the dissemination of information.

(Terrain, Tactical Situation, Communication and Security) in a specific area that determine this area.

Nevertheless, according to Sturari (1993, p. 181, emphasis added):

> The prevalence of mechanistic thinking in our daily life makes it difficult cause what is most important to prevail over the more numerous. Professional competence and personal safety is required if one is to consider the aspects of a maneuver and significantly distinguish one from the other.

That is, creative approaches must be appreciated, which is only possible by training, the greatest objective of the teaching-learning process.

Moreover, the words of the great military genius Clausewitz are to be taken into consideration: "most of the reports on war are contradictory, an even greater portion is false, and most of all portions have a questionable character" (LEONARD, 1988, p. 67). Therefore, a Cartesian, algorithmic modeling of decision-making factors, which may be false or erroneous, leads or may lead to significant mistakes.

In view of the above, the premise that the development of Critical Thinking is essential to the decision-making process adopted by the tactical commander is to be accepted because, in theory, it will enable wider and more complete views of the problem situations that arise from the current diffuse and complex environment of the world.

Moreover, the idea of learning "how" rather than "what" was reviewed by following the method, according to the doctrine (ALMEIDA JR; MATOS, 2009), in order to synthesize a new perception: teaching situation examination should allow the discussion of various tactical situations, which will result in a flexible assimilation of the doctrine and favor the construction of its evolution.

Finally, considering that "the ability to think well requires training and practice" (WILLIAMS, 2013, p. 52, our translation), and that the practice of creative thinking by itself will not lead to perfection, since the military needs a feedback from the instructor for performance improvement (SHADRICK; LUSSIER, 2004), we corroborate Fisher, Spiker and Riedel's (2009) assumption that establishing an integrated training program to address commanders' development of Critical Thinking skills on battlefield is preferable to the hope that such skills will develop on their own.

About designing a course focused on the Situation Examination, it is intended to maximize the time applied by the students to practice questionings and dialogs, learning how to make decision in ambiguous environment and minimize the tendencies to use comfortable old truths (WILLIAMS, 2013) as simplistic solutions or those already included in compendium of answers. A question arises: does this "imported" thought converges with the Brazilian reality?

4 CRITICAL THINKING IN SITUATION EXAMINATION APPLIED TO THE BRAZILIAN TERRAIN MILITARY DOCTRINE

The National De fence Policy (BRASIL, 2012) guides that preserving security will require broader measures that involve, besides external defense, civil defense, public security, and such policies as economic, social, educational, scientific-technological, environmental, health and industrial.

It also discusses that today's world faces complex challenges, which, among other factors, requires improving the training of the Brazilian Armed Forces to perform growing responsibilities in humanitarian action and peace missions under the auspices of multilateral organizations, relying also on the ability to participate in such operations established or authorized by the UN Security Council. In other words, Brazil must build capabilities to participate in operations around the world, as already is done in Haiti and Lebanon, and in the command of the mission in Congo.

As said above, this possibility requires operating in a broad spectrum, which is defined by Visacro (2011) as the combination of offensive, defensive, intelligence, special, information (civil affairs, civil-military cooperation, support for information, social media), electronic warfare, humanitarian assistance operations and stability and support operations. Under this conception, the then 3rd Deputy Chief of General Staff of the Army, conductor of the doctrinal transformation of the Force, discussed that:

> the employment of military force is broader, as they articulate and unfold operationally for combat, but are closely monitored by the political tiers through engagement rules, specifically set up for each mission. In the case of destruction functions, the ability of the enemy to oppose the implementation of policy objectives is used to attack and destroy. Recent examples: the Gulf War (90-91) and the Falklands War (82) (ARAÚJO, 2013, p. 21).

Therefore, the same set of fuzzy variables that require the training and improvement of leaders required to possess critical thinking skills is assumed. In fact, in recent times the Brazilian Army is and has been employed as a peacekeeping force in Haiti, in subsidiary actions at the border, in enforcing law and order in socially vulnerable areas in Rio de Janeiro, environments requiring the commander and his Staff to be aware of all available information, analyzing them critically.

Maia Neto (2012) supports this inference, indicating that one of the capabilities the Brazilian Army military should develop by 2030 to substantiate the transformation process include Critical Thinking.

In turn, the current decision-making process of the tactical commander in the Brazilian Army follows a methodology derived from that of the US. Its origin dates back to the French Military Mission (1920) (STURARI, 1993).

Under the Brazilian doctrine, Situation Examination is defined as a Cartesian military problem solving process, aimed to set up the best way to accomplish a mission (BRASIL, 2003). At the tactical level, propositions and sequencing are defined by Company Manual 101-5 C – General Staff and Orders.

Under the Army Education System, the Army Command and General Staff College (ECEME) is responsible for preparing the General Staff officer, the top-level adviser, the commander, and the military chief; besides contributing to the development of the doctrine and conducting research in military sciences (NUNES, 2012).

ECEME Patron, Marshal Castello Branco, is the author of one of the sentences that better reflect the level of Critical Thinking desirable for the adviser to the tactical commander:

> An officer of the General Staff is both a renovator and a creator. He is supposed to fight against conservatism, thereby becoming permeable to new ideas, so that he may escape crystallization, conformism and routine (BRASIL, 1984, [p. 330]).

In the current ECEME Planning Guidance (DIPLAN) we highlight a few basic assumptions required to achieve his mission:

> The focus of the teaching-learning process remains the officer-student. Within the context of adult education (Andragogy), the role of the trainer goes beyond the mere transmission of knowledge and includes the need to provide the proper conditions for a good learning environment. The instructor must understand their role as counselor/facilitator and be aware of the need of individual preparation deriving therefrom (ECEME, 2013, p. 2).

In this fragment from DIPLAN, we focus on aspects converging to the development of Critical Thinking. As regards the work of the instructors, an definition of their role approaches the thought of Williams (2013, p. 53), by which "learning facilitators should never provide answers" in order to stimulate criticality. Moreover, the focus on Andragogy and the characteristics of teaching role line up with the Freire's thought (1996, p. 22) about what fostering autonomy in teaching means: "teaching is not transferring knowledge, but rather creating the possibilities for its production or construction"; such an autonomy favors decision-making at critical moments.

In another assumption, DIPLAN states that "group work should be widely employed and refined in order to obtain the best result in the teaching-learning process" (ESCOLA..., 2013, p. 3). This assumption is following suit the Shadrick and Lussier (2004) guidelines, by which isolated practices will not result in perfection, as well as Fisher, Spiker and Riedel (2008) guidelines, as they believe that individuals have varying quality in Critical Thinking, thereby demanding, in group work, dialog and challenging discussions in order to obtain the best practices.

One last basic assumption states that "teaching should not be limited to the contents of doctrinal manuals. Broad spectrum situations should be included" (ESCOLA..., 2013, p. 3). This assumption has been detected for several decades. In the 1950s, Castello Branco said that

> solutions should never be absolute (...) They are formulated and evaluated to support the decisions made by the chief (...) and they should include the several alternatives offered for the choice of the commander (CARVALHO, 1994, p. 155).

Sturari (1993, p. 170), for example, said that both students and instructors "insist that only those examples included in the manuals are truly valid", which causes solutions to come close to book examples. This problem is not only ECEME's problem. In turn, Williams, in his evaluation of the American system, said:

> The problem of our education system is that it relies on an educational approach in which teachers and students guide and are guided every class to rediscover the same truths, often banal, from their predecessors (WILLIAMS, 2013, p. 50, our translation).

Here arises another problem, the solution from the previous year. Having a solution, the student will behave just like Shadrick and Lussier (2004) say: they tend to jump to the decision before gaining sufficient understanding and depth in the situation. They fail then to meet such school goals as synthesis, analysis and evaluation, and start to show taxonomies of knowledge and understanding.

In such cases, according to Williams (2013, p. 50-51), "the best strategy is to adopt an educational philosophy that focuses less on knowledge and content and more on the ability to question and dialogue. [...] Good questioning forges best thinkers". Or, as suggested by Allen and Guerras (2010, p. 35), "leaders (...) are supposed to create an environment where Critical Thinking is the norm and the reasoned debate replaces veiled divergence".

One possible solution would be encouraging all Staff Member to execute all orders so as to compare the different lines of action with among each other, thereby encouraging exchange of arguments to develop Critical

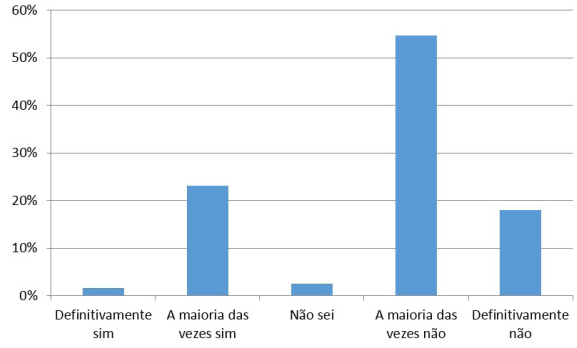
Thinking. This requires either increased time for carrying out the orders, or a reduction in the number of issues per week. This would also contribute to that which Williams (2013, p. 53) infers as ideal: "Even if students conflict with colleagues or superiors more interested in easy or simplistic answers, will let the imagination, questioning and criticality will allowed to flourish". What is student perception about this process?

5 STUDENT SURVEY: COMMENTS FROM PARTICIPANTS

In this section, the results from participant observation are mixed with the results of the survey. The questions in the survey derived from author's participant observation.

The first question dealt with the perception of the students about the development o Critical Thinking skills in ECEME tactical issues. The student was asked about their perception of this statement: "The way themes are addressed in the classroom allows for discussion of various tactical situations, resulting in a flexible assimilation of the doctrine and favoring the construction of its evolution."

Chart 1. Student perception on the development of Critical Thinking.



Source: In-house.

The result was:

After categorizing and interpreting this data, it appears that the negative perception ("most of the time not" and "definitely not" – 73%) is significantly higher[11] than the not negative perception ("definitely yes", "most of the time yes" and "I do not know" – 27%).

Therefore, it can be said that, in student perception, there is a gap in the development of Critical Thinking skills in ECEME tactical themes.

In the second question of the survey five student profiles were characterized[12]. The first is that of a student who is directly concerned with the test, becoming interested in crystallizing the knowledge that may be in contained in the evaluation (PF). The second is precisely the one that values the skills that are closer to the Critical Thinking (PC). The third is that which seeks to learn how to work in groups (GP). The fourth is the one that is always busy, and decides to use previous solutions to optimize his time (CA). The fifth is the one that seeks to learn the doctrine (DO).

Students were asked to tick, in accordance with the above profiles, postures that best characterize their behavior in this environment, as follows:

> Sort, from 1 to 5 (1, 2, 3, 4, 5), the attitudes that best characterize your posture in the classroom, during the preparation and discussion of orders (1 for best characterizes, 5 for lest or not characterize):
> ( ) What worries me most is what the instructor-rapporteur speaks in the room. This will be requested in the test!
> ( ) I try to understand the doctrine so that I can solve military problems that do not necessarily follow doctrinal precepts.
> ( ) I try to learn how to work in group because this is what I will be using in the future.
> ( ) I just want is to answer my request and that's all. If possible, I use the "cabral" to save time and get rid of another dish!
> ( ) I try to understand the doctrine so I can use it in real life.

According to the results shown in the second chart, PF was the most recurrent profile, with no significant differences from PC[13] and DO[14] profiles. That is, just as there are students whose behaviors are more focused on the degree of proof and the doctrinal learning, there are students with postures Critical Thinking, indicating fertile ground for the development of skills and the field of study for Critical Thinking.

It is to be highlighted that the "concerned about the evidence" (PF) posture was significantly[15] more characterized than "learn hoe to work in group" (GP) posture; the latter will precisely be the ECEME final work. This shows student's immediacy in their learning activity because of the need to get good results in evaluations, thereby hindering the development of Critical Thinking. This scenario has to be changed, which, according to Freire (1986), depends also on the teaching profession, because teaching involves risk and acceptance of the new, respecting the knowledge of the learners.

The third question takes into account the weighings of Williams (2013), who discusses the fact that the student, instead of learning how to argue and discuss in groups, is encouraged (intentionally or not) to

11 Based on the Chi Square Test (MATOS, 2004), with a confidence level of 95%, p [$X^2c > X^2a$] = 0.0000.

12 These five profiles are consistent with the participatory observation of the surveyor in the classroom.

13 Applying the Kruskal-Wallis Test (MARTINS, 2005) the confidence range (IC): (-91.2632399, 22.5794792) was found, which does not indicate any significant differences (the range goes through zero).

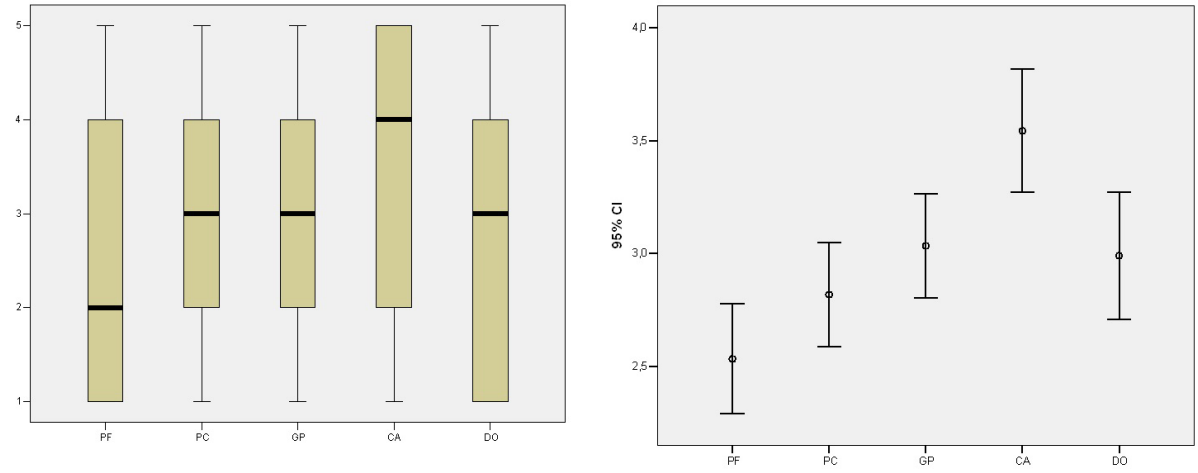
14 IC: (-178.10512; 64.2624011) – without any significant differences.

15 IC: (-117.494009; -3.65129002) – there are significant differences (the range does not pass through zero).

rediscover the truths from their predecessors. In other words, this means using a database with solutions from previous year, which in the Brazilian Army received the nickname of "cabral"[16].

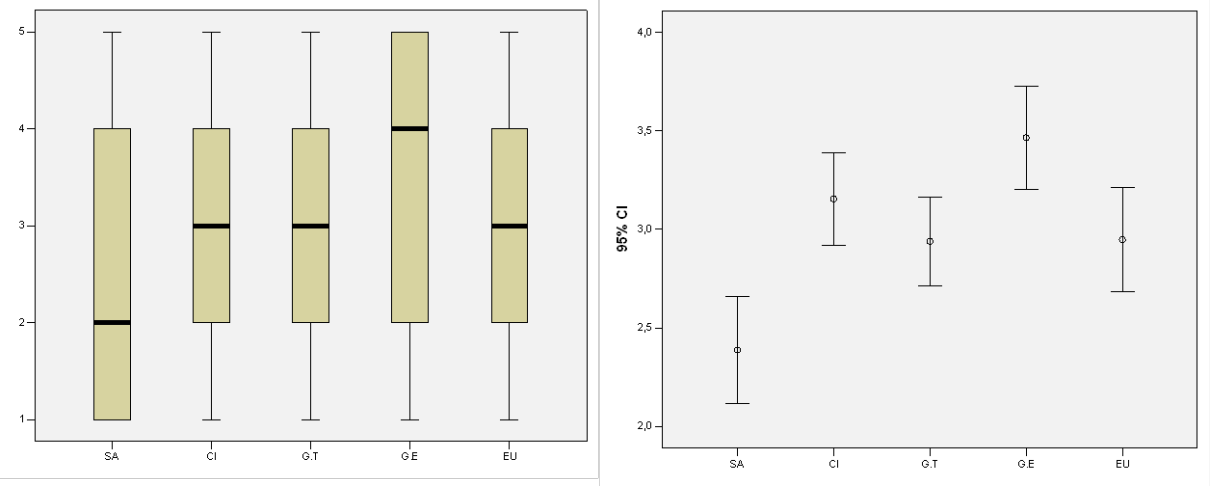
Therefore, we asked the students to list the factors that facilitated most their decisions on tactical topics: "cabral" (SA), Instructor comments (CI), help from a working group colleague (GT), discussion outside classroom environment (GE), and individual study (EI), as

Chart 2. Perception of student attitude in the classroom.



Source: In-house.

Chart 3. Perception of decision optimizing tools.decisões.



Source: In-house.

follows:

During the discussion of tactical defensive and offensive themes, choose what else facilitated your course of action decision:
( ) the use of previous solution (cabral),
( ) Instructor comments,

16 Possibly in reference to the one who discovered the country, according to the castrense tradition.

( ) help from an ECEME working group colleague,
( ) discussion with a colleague with whom I study outside the ECEME's GT,
( ) my individual prior knowledge and study.

As discussed in the third chart, therefore, "cabral" (SA) was the means that facilitated most the decision of ECEME students in tactical themes, with a 95% confidence level[17]. O trabalho em grupo (GT) vem em seguida, sem difere Group work (GT) comes next, with no significant differences against instructor's comments (CI) and individual study (EI); discussion outside classroom environment (GE); learning comes at a lower level. The sample revealed precisely that which goes against the development of Critical Thinking.

It was also possible to observe correlations between the use of "cabral" (according to question 3) and the responses to question 2. This correlation is positive, very strong[18], among those who use "cabral" and profile CB (the busy who wants to optimize time). That is, the busier the student believes he is, the more he uses "cabral". There is also a substantial positive correlation[19] between the "cabral" user and the one who has the concerned about the test (PF) profile. So, we can generalize that PF and CB profiles tend to use more intensely the previous solutions, thereby not contributing to the innovation of doctrinal thinking.

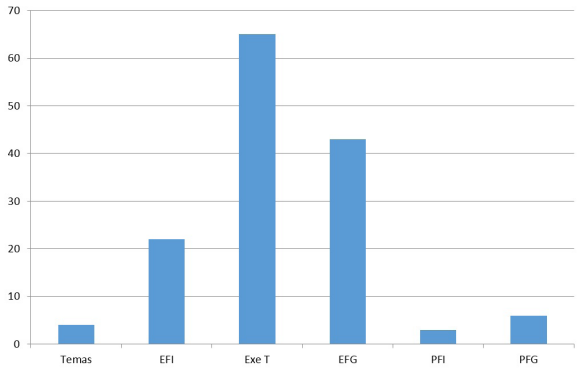
This correlation is negative[20], very strong, among those who employ "cabral" and those who have the wanting to learn the doctrine (DO) profile. That is, the more the students want to learn the doctrine, the less they use "cabral". In addition, there is a substantial positive correlation[21] between those who support individual study to make decisions (EI) and the DO profile, which entails that any student concerned with the doctrine seeks to take decisions more in isolation, not favoring the desired dialectical dimension of Critical Thinking.

Therefore, due to these correlations, the development of Critical Thinking can be optimized by stimulating the learning of doctrine based on the promotion of dialogue and discussion in group work, without this overburdening the student (seeing that he will tend to resort to "cabral") and will not encourage the crystallization of knowledge for examinations (which causes the student only discuss what may be in the test).

The last question was intended to see which techniques or processes adopted at ECEME facilitated more the development of Critical Thinking skills. Techniques or processes concerned included such fundamentals and application (themes)[22], formal individual[23] exercise (EFI), field exercise (Exe T)[24], formal exercise group (EFG)[25], formal examination individual portion (PFL)[26] and formal examination in Group (PFG)[27]. Prepared as follows:

For what type of exercise you felt encouraged to create innovative solutions:

Chart 4. Perception about the techniques and processes that stimulate the development of Critical Thinking.



Source: In-house.

( ) Foundation and application of themes
( ) Formal individual exercise
( ) Terrain exercise
( ) Formal group exercise
( ) Formal test individual part
( ) Formal test group part

Observations included the following, according to Chart 4:

With 45.45%, there is a preponderance of "Terrain Exercises" such as those that encourage the future Staff officer to develop creative solutions. In the space intended for justifications, in summary, the following arguments stand out:

- I could discuss my doubts with my colleagues;
- there was a need to work on the General Staff, interacting;
- by being in loco in the field, being able to make planning

17 Possibly in reference to the one who discovered the country according to the castrense tradition.

18 Employing Gil parameters (1999), the correlation coefficient (Q) value is 0.84482759.

19 Q=0.58222812

20 Q=-0.88129973

21 Q=0.67167698

22 In these themes, students learn and apply in work group methodology, the fundamentals of operations at the tactical level (use of the Land Force Component, Army Brigade and Division). There are instructions given by the Faculty and responses to requests are given by the working group. The instructor is the learning function facilitator, guiding the execution of the work. In theory, this is a situation that should stimulate both Andragogy and the development of critical thinking.

23 Formative assessment that does not contribute to the final grade of the student, carried out individually.

24 Work similar to the themes, performed with ground light, that is, in the field or in cities.

25 Formative assessment that fails to contribute to the final grade of the student, carried out individually.

26 Formal assessment that contributes to the final grade of the student, carried out individually.

27 Formal assessment that contributes to the final grade of the student, carried out in group.

more flexible and better comparing courses of action;
- this type of activity, there is the need to adapt the doctrine according to terrain characteristics;
- this is the time when students can explain their views without worrying about test score, releasing the formulation of creative solutions;
- because the terrain exercise comes after the formal test, this in itself, facilitates the development of creative solutions;
- there was neither "cabral" nor any other classroom bonds, such as concern about what the instructor will think of my solution;
- there was lower charging for standardized solutions, making reasoning more flexible;
- facilitates the construction of knowledge;
- other activities lead to a standardized reasoning; and
- this is the time you can discuss doctrine.

In the after-action analysis I could counter-argue my understanding in relation to that of other colleagues and education team.

It can be observed, therefore, that the Terrain Exercise allowed for the development of Critical Thinking skills. This is, in short, to the longer time assigned, to not compromising with test grades and real General Staff work. Furthermore, it appears that the more novel the theme is, the more it stimulates Critical Thinking. It is well known, however, that developing original themes demands administrative complications, such as printing letters, budget expenditures, and terrain recognition.

The second process that fostered most the development of Critical Thinking skills was the Formal Group Exercise, with about 30% of all observations. Among arguments used, the following stand out:

- "because it is not graded, which hinders creativity, because grade is what interests most in other situations";
- "because in this activity I would not fit myself in the possible 'in-house solution";
- "There was no pressure to respond to a series of requests with little time";
- "because I could work in General Staff, building the group's solution";
- "there was discussion among group members";
- "With help from other colleagues, it was possible to think 'outside the box';
- "it is necessary to motivate all members of the group so that solutions can really be inclusive";
- "there was no 'cabral"; and
- "the instructor managed to "deconstruct" the solutions from the students, thereby allowing for discussion of possibilities and shortcomings of each adopted course of action, each a different 'cabral".

Thus, one can see that, in the classroom, the methodology employed in this training activity performed its duty of developing Critical Thinking, because it encouraged innovative solutions, the discussion of problem solution, and the performance of the instructor as a learning facilitator. Because it was a formative activity, a result of the understanding of the fundamentals of offensive and defensive operations, it may not be applicable to all themes in the classroom. However, it provides subsidies for other processes.

With approximately 15.4%, the individual formal exercise was the third event that came closer to that which develops Critical Thinking. Motivations were as follows:

- "the theme was new";
- "it was not assessed with a grade";
- "There was no worrying about trying to guess the 'in-house solution';"
- "We had time to decide";
- "Teachers could have accepted a different solution";
- "Had the freedom to make a solution outside "cabral; " and
- "Was an opportunity to think creatively without harming the group."

Is worth mentioning that this individual activity received more consideration that the themes and formal group tests, activities that, in theory, the members of each Staff have an opportunity to discuss solutions. Because of the reviews and the participant observation, it appears that this is because the Formal Individual Exercise is not assessed with a grade and allows more time for decision than a fundamentals or application theme. Note, too, that this is an opportunity for the student to check whether the instruction team values other solutions, thereby demonstrating his reluctance to develop creative courses of action in formal examinations.

Following, the formal group test was the event that got 4.2% of the observations. The following comments stood out: it allowed for group thinking; it is the time on which the doctrine is already known so that it can be applied. In this framework, we see confirmed the relevance of group work for Critical Thinking, as well as the importance of fundamentals topics for further development of Critical Thinking.

According to the survey, the fundamentals and applications themes, as well as the formal individual test were the processes that less stimulated Critical Thinking skills, with 2.8% and 2.1% of perceptions, respectively.

Regarding fundamentals and application themes, the following comments were highlighted: not graded; is the time for development and application of knowledge, for discussion. Consistent with Fisher, Spiker and Riedel (2009), these themes should be the first time for stimulating Critical Thinking, which would have returned a more significant result in this survey. Consequently, ratified also by the perception of the students, there is an opportunity for improvement to foster Critical Thinking on these themes. How? Perhaps this will be by changing the grading culture in the school as a factor in career advancement. Many wish to get the grade of "Excellent" so as not to miss opportunities in the future, such as missions abroad or appointment as instructor.

For Formal Individual Test, the positive

comment was that it was the time for preparing to make decisions in a creative way. In fact, the assessment time reflects, among other possibilities, the inquiry into academic competence (AFONSO, 2009), which tends to regulate the meritocracy in institutions, such as the Army. But they can also be seen as that which provides the Educational Establishment with important information about the teaching method employed (BONAMI quoted by AFFONSO, 2009): it is a learning review.

In view of all that was discussed in this paper, it appears that the current methodology, which ascertains doctrinal application of skills with an aim to meritocracy, does not stimulate, systematically and substantially, the development of Critical Thinking skills, which, in the current application warfare scenarios, can cost a lot. The development of these skills is an opportunity to improve the teaching-learning process of ECEME tactical themes.

Confirming these data, we highlight the synthesis reported by one of the students on the topic:

> The large number of themes, the surface approach, tolerance with "Cabral", the lack of incentives to innovative thinking, the existence of grade as meritocracy factor, the existence of somewhat flexible key to test questions, the issue of crystallized depreciation , the non-planning of operation as a whole, over-tricks (which meet the purpose of helping to "raise" the grades), the failure to issue verbal orders to subordinate elements, the refusal to disseminate detailed operation orders and attachments, focus on form rather than on content, the large number of students in the classroom, lack of time, in short, all this results in bad degree of critical learning at ECEME. Everyone is imprison (crystallized knowledge) more than before entering the school.

This is a diagnosis of student perception on the development of critical thinking at ECEME.

6 CONCLUSION

The analysis of the development of Critical Thinking in the current ECEME tactical themes learning process was the central subject of this investigation. In summary, it was found that the Critical Thinking development process at ECEME lacks systematization and development in the classroom. Still, capabilities were observed that allow for stimulus, such as in the terrain exercises.

Critical Thinking is a very useful skill in the current conflict scenarios, as it involves the ability to use creative and holistic synthesis to get an edge in a framework where information is diffuse, uncertain and complex, aimed at decision making and problem solving.

The development of this skill converges to the current Situation Examination demands for the Tactical Commander of the Brazilian Terrestrial Military Doctrine. Deciding or ensuring decision making in the broad spectrum of operations in communities in social vulnerability, in the long Brazilian border, in Haiti or in any other continental or extra-continental site, require officers who are trained to innovate and create practices never before imagined.

This development is still an incipient process at ECEME and is partly due to the "grade culture." The student is afraid to exercise their creativity because they believe that this can damage their grade in the Course. Thus, they tend to crystallize those solutions that will guarantee a good performance in the formal examination. A change in this scenario is relevant to modify the thinking and substantiate the transformation of the Brazilian Army (MAIA NETO, 2012).

One suggestion includes the adoption of new examination parameters, done as a group, in order to allow dialogue and discussion, having as a tool the issue of verbal orders and written products. Performance would be computed according to the job done, previously designated by the School. All these performances together would characterize the summative evaluation of the student.

Another problem refers to the time assigned to the solution of orders in fundamentals and application themes. Under the current design, there is no time for dialogue and discussion within the Staff and among Staffs, which, together with indiscriminate use of "cabral" causes those exercises with performance levels designed to "evaluate", "analyze" and "synthesize", have lower levels, as "knowing" and "understanding."

Finally, it is recommended to carry out studies to verify the perception of instructors, designed to fit the tools for the development of critical thinking and to assess how much workload should be assigned to tactical issues at ECEME.

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