

## Chess game as an educational aid in the pedagogical process, for learning and motivation



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### ABSTRACT

This investigative study aims to investigate the experience of using the game of chess as a pedagogical didactic resource, in the facilitation of learning and school motivation, through the chess project in the state school Helena Pugó, school where the study was conducted, with the high school students of this school in the municipality of Recife of the state of Pernambuco, Brazil. With this work, we sought to know what influence the game of chess may have provided in the learning and school motivation of students of the 3rd (third) year of high school, showing the benefits that this seemingly simple game had its contribution,

helping in school performance and student performance. The methodology of the study used was of a qualitative nature, as it is more appropriate and indicated for this educational investigation, with better application results. The data collection instruments used were, for the participating students, a semi-structured questionnaire applied by the researcher, and for the participating teachers, an interview with the investigator. The research showed that the practice of students with the game of chess provided all the benefits narrated in the theoretical framework, such as the improvement of reasoning, memorization, concentration, attention, decision making, among other qualities that chess stimulates in its practitioners, helping to improve learning and school motivation of students and, consequently, school performance and educational success as a whole.

**Keywords:** School, Chess game, Apprenticeship, Motivation, Reasoning.

### 1 INTRODUCTION

We will address in this topic the issue that enabled us to awaken this theme worked, showing its relevance to the educational context and consequently of great importance for the pedagogical didactic process aiming at an improvement of learning and motivation of students for studies. From this, we show the problem itself in the teaching-learning process and thus work to seek resolution.

This study greatly evidences the importance of the systematic implementation of the teaching of the game of chess in basic education based not only on this investigation, but also on others that address the subject in question, using chess as the integrating axis of the school curriculum, to the extent that its practice in the daily life of schools has exerted a strong influence on the behavior of students, contributing positively to the development of the cognitive process of children, adolescents and young people. our exploratory research was carried out with the students of the 3rd year of high school of a state school in the municipality of Recife, state of Pernambuco, Brazil.

In this work will be analyzed the influence that the game of chess can provide and its incidence on learning, performance and motivation of students of the 3rd year of high school, when used as



another resource in the pedagogical didactic process as a school experience with students.

From this reflection, the researcher opted for an investigation within a qualitative approach of the descriptive type. The option for the qualitative approach in carrying out this research is to understand that it is suitable for the investigation of more complex social phenomena, as is the case of educational phenomena. The qualitative approach is justified by the interest in approaching and describing a complex and particular social phenomenon, as is the case of the teaching of the game of chess related to school learning in elementary school in the development of cognitive abilities, in the municipality of Recife, State of Pernambuco, and there is also the advantage of the observer being located on the same plane as the group to be observed, feeling and living as the group feels, without losing the place of observer.

The current world has gone through and is undergoing major transformations in all aspects and with the advent of globalization all sectors have undergone major changes, reflecting mainly on our society. In view of this, the school and the educational process mainly the teaching learning process was well outdated with methodologies, disciplines and contents totally boring and without arousing interest on the part of the students, where most of the time they are totally out of time and space, because they are students of the XXI century studying contents and disciplines with methodologies of the eighteenth century and with teachers still in the nineteenth century, providing students with difficulty and disinterest in learning and consequently in studies, leading to the failure of school performance, because they have no motivation in the educational process and leading most of the time to give up studies, because studying does not provide them with any futuristic vision for the market of the globalized world. From this, this work will aim to enable the awakening of students, rescuing in them the will to study, in order for them to return to have interest in studies and especially in learning, aiming at a better knowledge and opening better possibilities of improvement of their performance in the globalized world, aiming at a future that they can be integrated, qualified and prepared to be inserted in this globalization and in the labor market.

## 1.1 BRIEF HISTORY OF THE GAME OF CHESS

To make the history about chess, we start from the beginning that it is first of all a game and so we must work some aspects about games as well. The word game comes from juco "Latin word meaning joke". (Antunes, 2011, p.20).

The game in general is a stimulus to growth, as a cunning towards cognitive development and the challenges of living and not as a competition between people or groups that implies victory or defeat. The areas of multiple intelligences can be stimulated through the stimulation of a game of chess, through verbal stimuli, or any other external stimulus. "The diversity of environmental stimuli that interfere with the physical, cognitive and especially emotional development of the child, cause



immense individual differences." (Antunes, 2011, p. 25).

Rizo also states that "games are more valuable resources to stimulate the integral development of the learner, as they develop aspects such as attention, respect for the rules and perceptual skills to each type of game offered." (Rizzo, 1996, p. 30).

Starting by talking a little about the history of this millennial game, we can say that it is very confused with the history of human civilization, where we find several reports saying that it is the oldest game in the world that is made known, and it is not even known for sure its true origin, in which country or people really had its origin, finding several citations stating that it was in India the origin, others say in ancient China, or even in the Arabian peninsula its origin or we can say its origins, after all we have several narrative versions. And an Arab legend is told that through the game of chess a sage named Brahmin Sisso, advisor to an Arab king wanted his king to understand and take to his practice of governing, that his political and military strategies would have and should encompass all layers and social classes to be part also of this strategy of the ruler, even to the simplest layers (Schmidt, 2016). Thus, we can say about the influence that chess could exert on the strength and power of the king, helping to protect his nation and his power, for each piece of the game of chess has its importance and function within the game, thus making the relation of chess and leading to its dominant political power, making all the people participating from all strata and social classes that were under the rule of the king, were used in their strategies of conquest and power of their nation. That is why the wise advisor of the Arab king made a point of passing this on to his king and thus instilling in him the idea of always having all social classes allied and thus facilitating his reigning power, because he strengthened himself more and more and in consequence always having over his domination other peoples and civilizations, in addition to the ever-increasing conquest of land.

Historically it can be said that the game of chess has always been used as a tactic and strategy of war mainly in the medieval era, as we can prove in the report of authors who studied and study the said theme. One can highlight a comment by a leading scholar on chess, classifying it as a game of war when he states that: "Historically chess has been classified as a game of war" (Murray, 1913, p. 22). In a typical war game, two players conduct a combat between two armies of equal strength over a battlefield of bounded extent that offers no initial advantage of territory for each side. Players have no outside help and can only rely on their reasoning faculties, and usually "the player whose strategic ability is greater, whose strengths are most effectively placed, and whose ability to predict positions is more developed wins." (Murray, 1913, p. 25).

One can also highlight an important millennial work read even today, written by a Chinese philosopher Sun Tzu, written 500 years B.C., *The Art of War*, being one of the wisest and most important treatises on military strategy in history, teaching principles such as avoiding force and attacking the weakness of the enemy, winning without fighting and that the first enemy to face is



himself. It is therefore one of the most read books of all literary classics among the most varied types of public. Becoming a true manual of strategies in all fields, especially in the business field, guiding executives and political leaders. This work uses chess for its excellence of strategy, proving that the game can help in the formation and cognitive construction. The author writes among several points a comparison between chess and war: Similarities between strategy and tactics can be found in chess and war, when it is observed in his book *The Art of War*, by Sun Tzu, 2004. Important points of this work can be highlighted, which serve for the day to day, inspired by the game of chess, which can be applied by chess players as: I. Probe the plans of the enemy and you will know which strategy will be crowned with success and which is doomed to failure. II. It disturbs the enemy and causes him to reveal his movements. III. Discovers the tactical disposition of the enemy and causes him to expose his battle site. IV. He puts him to the test and discovers where his strength is strong and where he is deficient. V. The supreme tactic consists in disposing the troops without apparent form. Then the most penetrating spies can sniff nothing, nor can the most experienced sages make plans against you. VI. I lay out plans for victory according to these tactics, but the common man has difficulty understanding them. Everyone is able to see the outward aspects, but no one can understand the path by which I will forge victory. VII. "Never repeat a victorious tactic, but respond to circumstances according to an infinite variety of methods." (Tzu, 2004, p. 65-66).

In this brief history above about chess, it is noted how much it really is a very rich game and that can help a lot in the process teaching learning and motivation of students, because it stimulates and develops cognitive skills, helping and a lot in every educational process.

Also addressing the historical question of chess, Murray, 1913, highlights in his work *A history of chess*, where the historian points out that approximately fifteen hundred years ago, in India, the Chaturanga appeared, which became the current game of chess. Through many wars and in the search for new trade routes, chess was introduced in Western countries, and in the Middle Ages it underwent some metamorphoses that led it to its present form. The game of chess has gone through several moments since its emergence, passing from the ancient age, middle ages and contemporary, reaching our days, where today we can say that the simplest computer contributed to the popularization of chess and from the emergence of computers in the mid-twentieth century and the advent of the Internet, already at the end of the twentieth century, from the 50s, in the quest to build intelligent machines, sciences such as Psychology and Artificial Intelligence presented studies that accelerated the production of electronic chess players culminating in the IBM supercomputer Deep Blue, which in 1997 defeated Garry Kasparov in a re-match of six matches, with a result of 3.5 to 2.5. (King, 1997).

## 1.2 THE GAME OF CHESS AS A DIDACTIC-PEDAGOGICAL INSTRUMENT



"The school should be seen as the transport responsible for social transformation, and should have as objective and goal to be achieved, stimulate its students since childhood to have conditions for a development and growth in a healthy, conscious and playful way, aiming at their emancipation in the world". (Pereira, 2015, p. 63).

And this healthy and playful environment that Pereira cites, we can also encompass challenging environments through games that can stimulate the students' reasoning, based on what another great scholar in the area of education said, when he says: "the use of games provides challenging environments, capable of stimulating the intellect, providing the achievement of higher stages of reasoning". (Rego, 2000, p. 79). That is why we affirm that making the environment healthy for all involved should be important and this we see in Rego's statement, because the healthy environment provided by the playful will be an adequate and challenging space, stimulating the cognitive process of the students within their perspective of the development and psychic maturation, providing a more harmonious development of the educational process as a whole and of all the entities involved.

Emphasizing the school pedagogical process, it can be said that the game of chess presents itself as an economic and effective option, capable of stimulating psychomotor functions necessary "for the initiation and development of logic, language, reasoning, memory, as well as educating socio-affective qualities such as discipline, attention, creativity and organization" (Sá, 2005, p. 60). Once again a researcher's work reports the beneficial effects of the game of chess in the development of questions related to reasoning, language, logic and in the formation as a whole of the students, when used in the school pedagogical process.

Pedagogical chess is actually one more resource available to the educator among many others already used, but perhaps it is not well adjusted in the teaching-learning process or because it does not arouse more interest on the part of the students, being the pedagogical practice of chess as the element that can help and change this learning framework, leading to a greater willingness to learn on the part of students. The practice of chess in school by itself already brings benefits to students and teachers. What is needed in fact is that the educator knows how to explore it in all possible ways in his classes, always seeking to extract the content from the game. For example, before entering into the concepts of Arithmetic and Geometric Progression, in the first year of high school, an introduction could be made regarding the origin of the game of chess. The History teacher would speak his part (historical) in his classes and, based on these classes, the Mathematics teacher would talk about the legend about the origin of the game of chess, while the geography teacher would talk about the geographical situation of the region in question, that is, there being an interaction between the disciplines causing there to be a greater motivation and interest in learning and certain content of the disciplines. Thus, a greater educational success and a greater interaction of the students in the contents and learning of the disciplines.

Other great recent works such as that of Giachini in 2017, where he studied the influence of



chess on the development of concentration capacity in elementary school students, where he proved the existence of this influence to have contributed to this.

We found a good work carried out by Oliveira in 2019, also carried out a work on the importance of chess in the cognitive development and school learning of students and concluded that really chess can help in the process of school learning of students and their practitioners. Another very good and also very recent work, published in July 2020, on chess as a teaching tool, in the journal *Gestão & Educação*, by Andréa Luna de Oliveira, where the author reports the importance of teaching the game of chess as a great teaching tool for learning, associating the improvement of the understanding of the contents of mathematics, of the Portuguese language, geography, art and other contents and disciplines taught, helping in the understanding of more complex contents to be taught and learned. We highlight another great work done by Rodrigues in 2020 when he made a thorough study with chess in relation to special students, on the theme of learning of students with intellectual disabilities under the support of the game of chess in the school context, where his work highlighted the importance of working this game to help in the intellectual process and cognitive improvement of students with intellectual disabilities, reaching excellent positive results, when used this game in the classroom in the teaching-learning process.

## 2 METHODOLOGY

In the methodology adopted, we will report how the researcher defined the instruments that were used in data collection and how he performed and in what way, in addition to the analysis of all data and thus be able to achieve the proposed objectives of the work, detailing how the study was carried out, allowing to evaluate the method, reliability and validity of the results obtained.

The investigation was based on the descriptive process, because it aims to describe how the impact on the learning and school motivation of the students participating in the sample of the 3rd year of high school of the Helena Pugó school was used, when chess was used as a pedagogical didactic resource, aiming at a better learning and motivation of these students and consequently better performance and school performance after the chess experience. In carrying out this study, the researcher had no intervention in the data or in the results obtained. According to Gil (2008, p. 51) "descriptive research aims to describe the characteristics of a population, phenomenon or an experience". This type of research used made it possible to answer our proposed objectives and describe the contribution that chess can bring to the educational process.

The research was also cross-sectional, because it was carried out by the investigator directly with the students and teachers participating in the sample of the investigative process (teachers of Portuguese language and mathematics) cross-sectional investigation, because it was carried out at a certain moment of time in a brief and fixed period, through the application of the research instruments



with the students (semi-structured questionnaire) and teachers (interview), participants in the investigative research, in only one time. After that, the results of the variables relating chess and its contribution to the learning process and school motivation of the students were described.

The research was qualitative as a focus, because it sought to observe, analyze and better understand the reality of the context of the educational process (with the students of the 3rd year of high school, participants of the investigation), seeking to know what the impact of the game of chess on the learning and motivation of high school students (3rd year), when using the game of chess as a pedagogical didactic resource, if there was a positive contribution of the game to the solution of the problems inherent to the theme discussed, such as improvement of learning, performance and school performance, motivation, change of attitudes, improvement of cognitive ability, memorization, behavior and interest in continuing studies by the students. This type of qualitative research is also justified based on Campoy's statement when he says: "The qualitative methodology its advantage lies where the observer is situated on the same plane as the person or group observed, in such a way without losing the place of observer, feeling and living as they feel" (Campoy, 2018, p. 345).

## 2.1 POPULATION

The population consists of 30 (thirty) students of the 3rd year of high school and 08 (eight) teachers also of the high school of the referred school, who participated in the selection of the sample.

## 2.2 RESEARCH PARTICIPANTS (SAMPLE)

The number of participants selected to be part of the sample for both students and teachers of the 3rd year of high school were a total of twelve (12) students and two (2) teachers by the selection criteria for the sample.

## 2.3 CRITERIA FOR SELECTION OF SAMPLE PARTICIPANTS

The selection of participants was performed by criteria established by the researcher, where, in this case, twelve (12) students and two (2) teachers were selected as participants of the investigation. The students were selected by the following established criteria: to be students of the 3rd year of high school of the referred school, to have chess experience for at least three (3) years in a row or not and less absentee students. The teachers selected as participants were also selected by the criteria: to be from disciplines with a greater number of classes per week with the 3rd year high school class of the referred school, teachers with more time of pedagogical experience with these students and older teachers of teaching with these students and who follow and know the school trajectory of these participating students (at least two (two) years with the participating students). This choice of the participants of the investigative research of both students and teachers (of the subjects of Portuguese



language and mathematics, because they have more classes per week) was carried out by a sample of non-probabilistic and intentional selection, explained by Campoy (2018, p. 84).

#### 2.4 DATA COLLECTION INSTRUMENTS

The instruments used for data collection were: semi-structured questionnaire of ten (10) questions for the students of the 3rd year of high school of Helena Pugó school, who were part of the sample, selected by the selection criteria for the sample. And an interview with the teachers of the 3rd year of high school of the referred school, of the disciplines of Mathematics and Portuguese Language, also selected by the selection criteria for the participatory sample.

#### 2.5 CONSTRUCTION OF THE INSTRUMENTS (QUESTIONNAIRE AND INTERVIEW) AND DESCRIPTION OF THE VALIDATION OF THE INSTRUMENTS USED

The instruments used in data collection (questionnaire and interview) were previously forwarded to 05 (five) professors-doctors of the Universidad Autónoma de Asunción-UAA, with the purpose of analysis and consequently propose some change that becomes relevant to the research. Thus, the experts followed two criteria established for validation: Coherence, in which it establishes that the questions should be correlated with the objectives of this research. Clarity, at this point, was observed if the questions would provide with the understanding on the part of the interviewees. The result of this evaluation by the experts resulted: Changes in the concepts used to elaborate the questions in the questionnaire guide and observation script. All questions were kept as planned from the beginning, as they were presented according to the criteria established for validation of the instruments.

#### 2.6 DATA COLLECTION INSTRUMENTS

The instruments used for data collection were: semi-structured questionnaire of ten (10) questions for the students of the 3rd year of high school of Helena Pugó school, who were part of the sample, selected by the selection criteria for the sample. And an interview with the teachers of the 3rd year of high school of the referred school, of the disciplines of Mathematics and Portuguese Language, also selected by the selection criteria for the participatory sample. All the two instruments used had their construction and validation. This investigative research was carried out from the answers of the students selected as participants of the sampling and from the interview with the selected teachers also with participants of the sampling, from the Helena Pugó State School, Recife neighborhood, state of Pernambuco, Brazil. To collect (collect) the data, a semi-structured questionnaire of ten (10) questions was applied, applied by the investigator to the students participating in the investigative process. Questionnaire relating to the experience that students have lived or live in their school and personal life about the influence that chess may have brought, influencing and helping or not in their decisions





and interest in continuing studies, learning, concentration, memorization, reasoning, decision making, etc. The questionnaire was distributed by the researcher among the students participating in the investigation of the 3rd year high school of the Helena Pugó state school, who had the requirements to participate in the research. And the participating teachers also participated through an interview with the investigator, reporting how the performance, school performance, in addition to the situation of improving the learning and motivation of the students participating in the investigation after these students experienced chess in their life, reporting if there was any modification of the student from when he began to be part of the school chess project or have already experienced chess in some other way, analyzing the trajectory of the students participating in the research as they find themselves after chess experience in relation to the motivation for studies and school learning.

## 2.7 PROCEDURE FOR COLLECTING AND ANALYZING INVESTIGATIVE RESEARCH DATA

The collection of the aforementioned data was performed first by applying the semi-structured questionnaire with the students and then by interviewing the teachers. It was carried out in a single time by the investigator himself with all the students of the 3rd year of high school, participants of the investigative sample of the referred school, the application and the collection of the semi-structured questionnaire. As well as, subsequently, the interview was conducted with the teachers participating in the sampling also from the referred school, carried out by the investigator himself in a single time. After applying the research instruments and collecting the research data, both with the students and with the teachers participating in the investigative sampling, a survey of the data applied and collected by the researcher was carried out both from the semi-structured questionnaire answered by the participating students and also from the interview with the participating teachers. After collecting and collecting the previous data, the necessary interpretations, qualification and description of the data obtained were made, then studied and analyzed by the researcher, making the relationship of chess with the development of the cognitive skills that the game may have provided or not to the students, helping or not in the improvement of the learning and school motivation of the students, making a better diagnosis in relation to the students, relating the categories to the improvement of learning, logical reasoning, decision making, memorization, concentration, better reading, textual interpretation, autonomy, improvement of behavior, critical thinking, among other skills that chess can help or not, in addition to the motivation in the continuation of studies. The investigator did this by analyzing the questions and answers of the students participating in the investigation, relating the studies of these students with chess and chess with their decision-making, together with the similar answers of other students also participating in the investigation, in addition to relating to the interview with the participating teachers (participants of the new pedagogical didactic process), about how he established the learning and school motivation of the students investigated after the chess experience. After that,



tables and graphs of the qualitative analysis of the investigation with the students and teachers of the results obtained were made.

### 3 RESULTS AND DISCUSSION

After analyzing the data collected by the instruments used, we divided it into seven items that were analyzed and discussed.

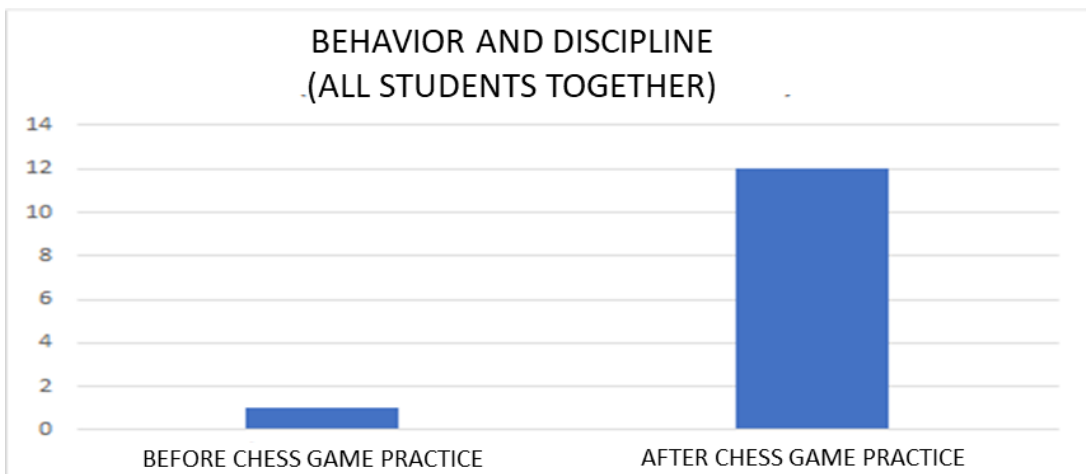
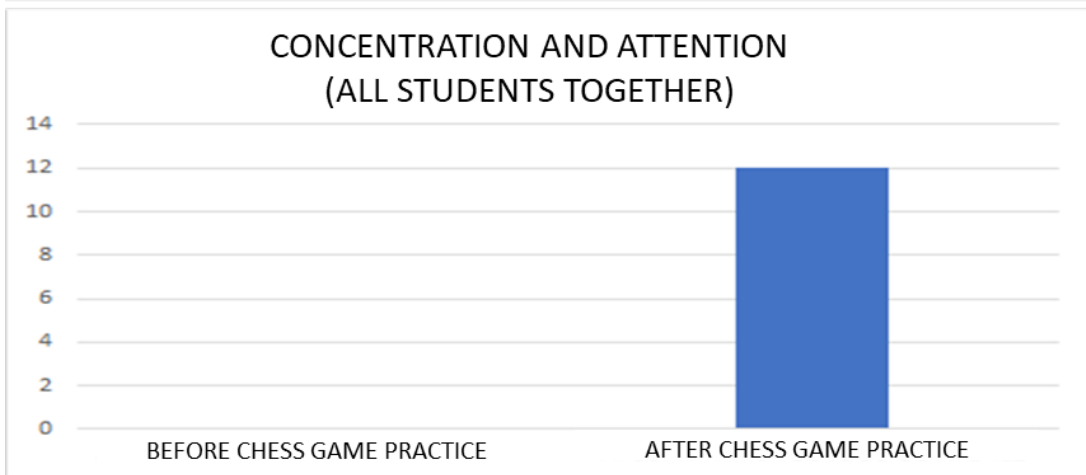
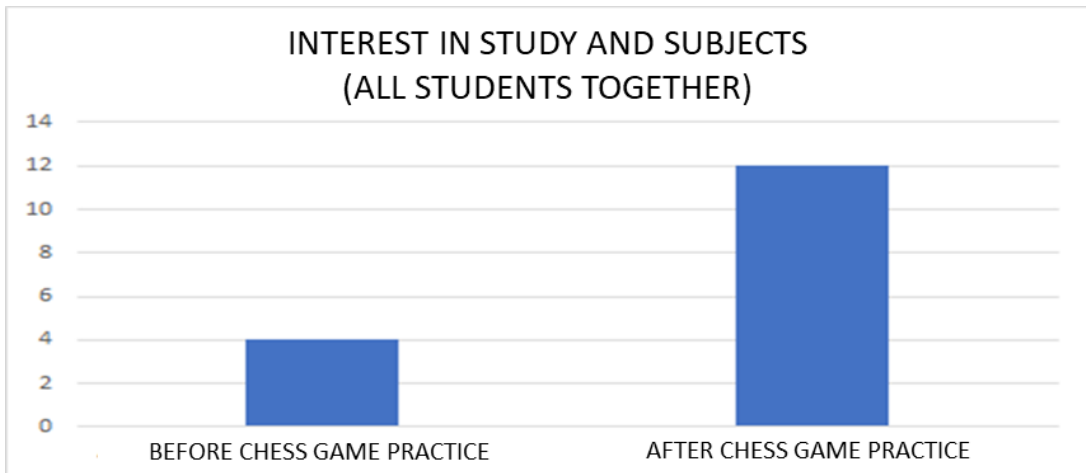
The items analyzed were: **1-Interest in studies and disciplines; 2-Memorization and reasoning; 3-Concentration and attention; 4- Organization and structure of understanding; 5-Behavior and discipline; 6-Decision making and self-esteem; 7-Motivation to complete studies.**

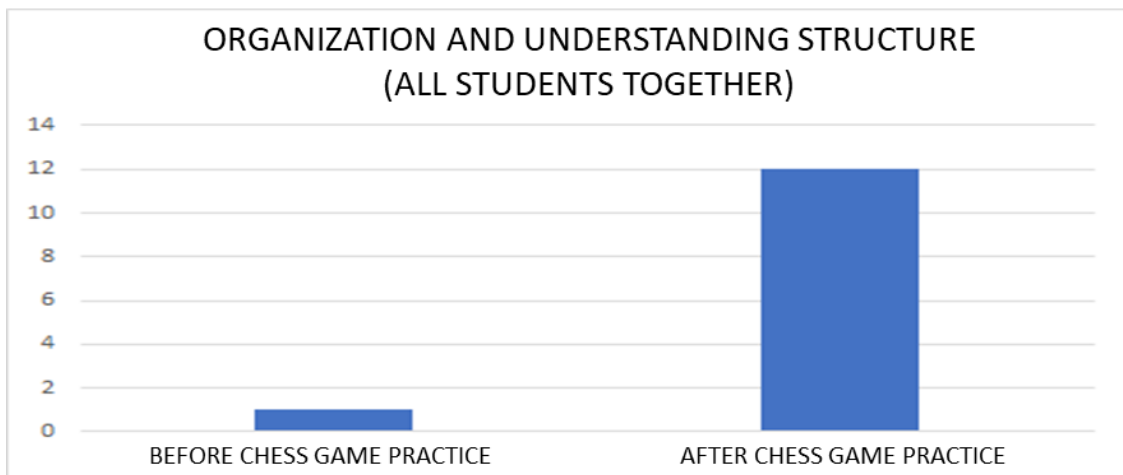
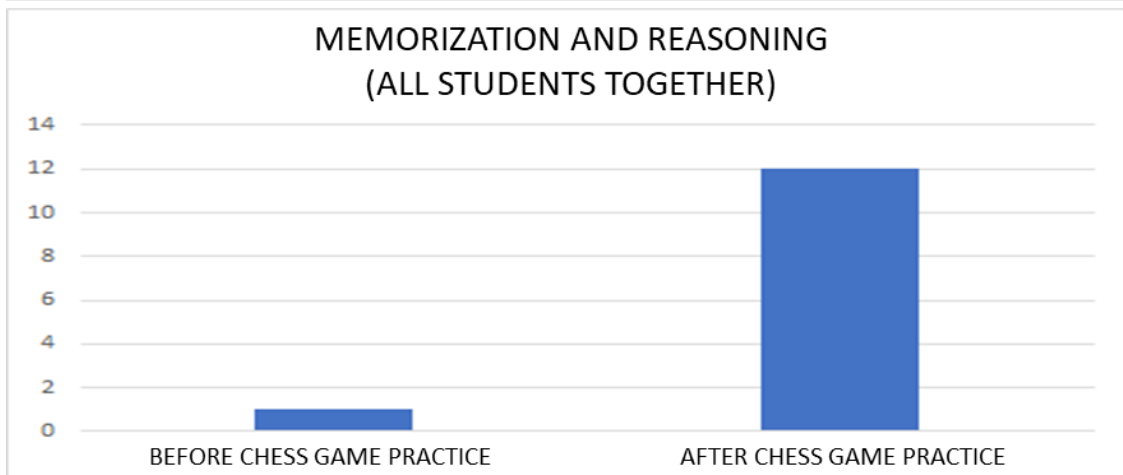
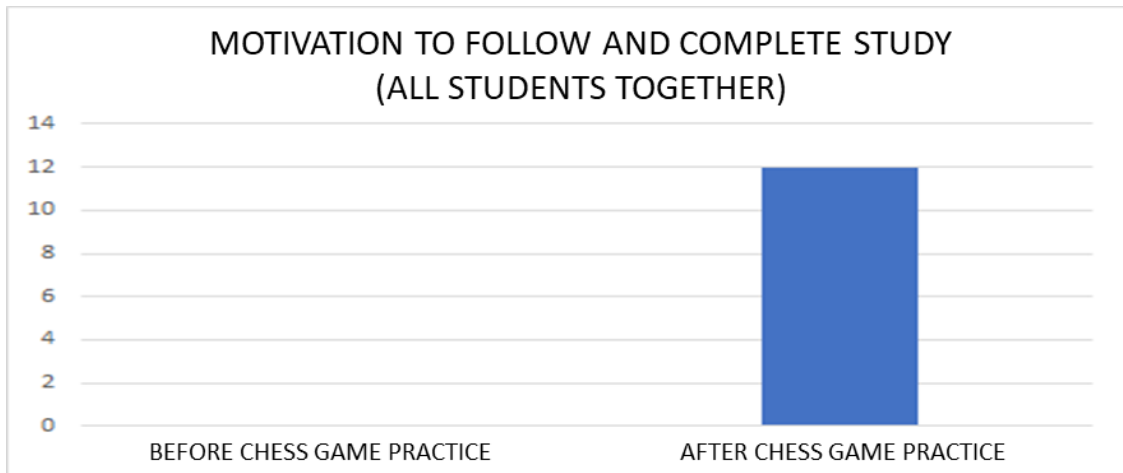
The twelve (12) students selected as participants of the non-probabilistic and intentional sample were divided as follows: six (6) male students and six (6) female students, all from the 3rd year of high school of the school in question, who answered the semi-structured questionnaire; and also the two participating teachers, one from the discipline of Mathematics and the other from the discipline of Portuguese Language, who were also part of the sampling through an interview conducted with the researcher himself, about how his gave the learning and motivation of his students after the experience with the game of chess, as well as about the aspect of chess and its influence on the learning process and school motivation and on the lives of the students.

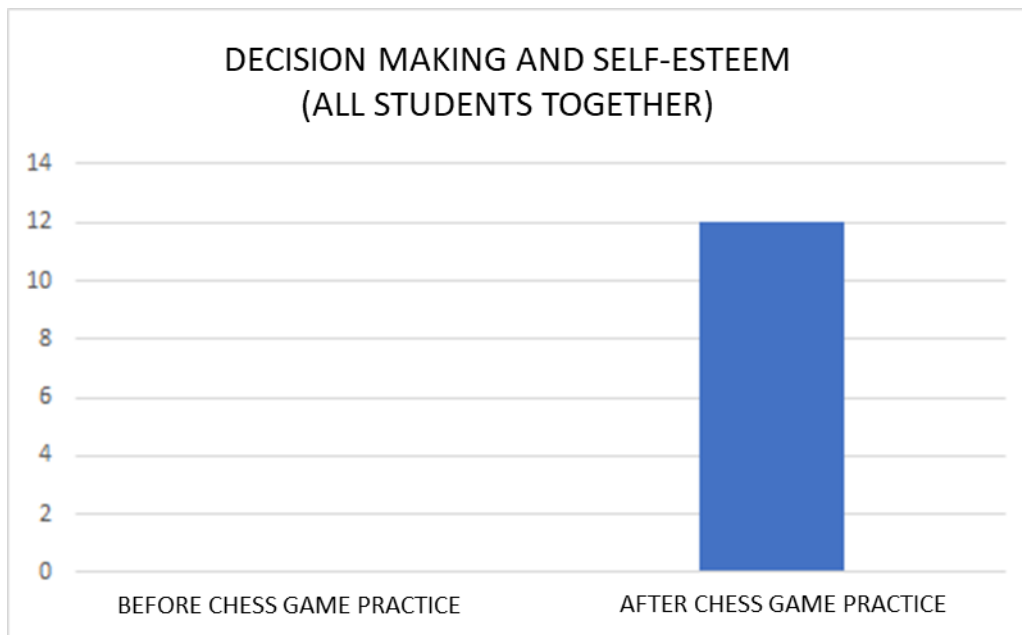
With regard to the results obtained and making the discussions of them and relating to the aspects analyzed, we can say that, with respect to all seven items analyzed in this investigation on the influence of the game of chess related to learning and school motivation,: both male and female students participating in the investigative sample had, After the experience of the game of chess, all aspects developed in their cognitive abilities such as concentration, memorization, self-esteem, behavior, discipline, motivation for studies, decision making, interest in following the studies.

Therefore, we prove by this investigation that the findings of the literature on the importance of the game of chess really enables the development of students' cognitive skills in general and, consequently, helps in the better quality of school learning and a better motivation of students for studies.

Below are the graphs prepared with the results of the investigation:







#### **4 FINAL CONSIDERATIONS**

We can say in a general way that the results we found in our research surprised us, even though there are several reports in our theoretical framework affirming the importance of chess in the pedagogical process assisting in the development of cognitive skills, which will lead to the improvement of school learning.

In our research we found that there was a significant change in school learning and motivation in the students who practiced chess, that is, the participants of the investigative sample and also of school chess.

Another important fact is to teach the game first in a playful and pleasurable way, and then to use it as a pedagogical form itself.



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