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Chess as a pedagogical tool

Abstract

The present article discusses an original way of learning chess in the school context. This proposition concerns the first year of learning chess by the seven-year-old pupils. The organizational principles are described, resulting in the children's age, psychological disposition and didactic implications. Four school subjects are linked with chess instructions. Firstly, chess is presented as a physical education, which is not common. Subsequently, Polish, mathematics and arts activities are suggested. The whole project is dedicated to promoting chess learning in a friendly context, even for children who will not choose to become chess players.

Keywords

chess, primary education, integrated skills

1. Introduction

The aim of this article is to provide a solution to the problem of teaching chess in large groups which are not chess-oriented. The proposition concerns seven-year-olds because at this level of teaching, the problem seems most serious. The first aspect to discuss has to be the motor phase of child development. The second one will be the integrated character of teaching at this school level. It will be proved that learning chess through movement can resolve both problems.

Two different and common methods of teaching chess are: firstly, at home and secondly, in a club. A new way—at school, for the whole group just has come to the fore. A pedagogical approach in this case, emanating from the first two methods of teaching, is inappropriate.

The first situation takes a truly pupil-oriented approach, including: personalized explanation, modification of the game to meet individual needs of the player, to reduce the differences between the players' level (for example: the person who teaches plays without the Queen or without pawns, etc.), a time-slot is chosen in an appropriate way when the „teacher” and the „pupil” are in a good mood, are not bound by time limits, and are at leisure.

The second situation is characterized by the pupils' attitude: they are ready to study chess—by their willingness to study, and by level of intellectual development. Usually, the groups of pupils are small, for example 10–12 persons. In addition, they can be of different levels, so that the teacher can explain advanced rules to some pupils and the beginners can observe them at the same time.

In the case of popularizing chess classes at school, the situation is completely different. Usually, in the field of public education, groups are large—over 20 persons. The seven-year-olds are at very different stages of physical and intellectual development. Therefore, they differ in the way in which they deal with different kinds of activities, for example, some of them can run very fast, others are able to focus on one topic for longer. The risk arises in a situation when, encouraged by the advantages of learning chess, the teacher (or school authorities, or the government) impose chess learning on everybody in a tournament-like approach to teaching. For pupils who do not have appropriate skills for learning chess (and these are over-represented in an ordinary group), this forceful approach can lead to low self-esteem. Indeed, the teacher has to offer a wide range of activities to suit particular skills. The target is to identify the topmost types of skills represented by individual children, and identify those who potentially qualify for playing chess.

2. Didactic unit composition

The lesson comprises a single meeting which has its own aims and schedule. The didactic unit is the sequence of a few lessons with a common topic. At integrated teaching level, it is customary to propose to pupils didactic units rather than single lessons. The purpose of the methodology is repetition of contents in various contexts, which stimulates pupils to memorize it and understand the leading point of a particular unit.

You will find below a framework of a didactic unit, which can be helpful in planning your own units.

At the beginning, as a warm-up exercise, it is useful to recall some content from previous classes or introduce a new item through writing or drawing activities. It helps to calm down pupils and enables them to focus on chess.

The second phase of a didactic unit is to offer them some vocabulary and explanation of the topic, which can also be written.

At this stage of learning pupils need some physical activity, so these needs can be realized by learning through movement on/with big garden chessboard or chess Klanza sheet.¹ Later on, pupils can shift chess pieces or pretend to be one.²



¹ The usual Klanza sheet is a round, colorful piece of cloth, with handles all around. It is used to make integration games, e.g. changing places for people holding the same color or named colors, going under the cloth if they fulfill certain characteristics, etc. The same way of playing can be proposed for the colors white and black, letters and figures used on the Klanza sheet imitating a chessboard.

² Image provided by Author.

After the stage of *learning chess through movement*, the teacher asks the pupils to perform activities involving the fresh knowledge, using small chessboards or their flat paper representations. This is also an appropriate time for making pupils play a kind of a duel game, with rules they already know. Pupils are usually very pleased to play a game, so even a simple round with pawns will be considered by them as a real challenge.

Finally, the teacher has to obtain some feedback from his students by asking them questions or listening to some comments they want to express spontaneously. The chess class can finish with a cheer, for example “We are one Family”, which is a FIDE (International Federation of Chess) slogan.

3. Learning chess through movement

3.1. Games with the chess Klanza sheet

In order to accustom children to the chessboard, it is possible to make them have fun with Klanza sheet type activities. For example, they can hold the four edges of a chess sheet cloth and walk around in a circle singing a counting-out rhyme referring to chess.

The pupils can also hand the chess sheet cloth to one another, until they arrive at the same letter/ or number on the opposite side of the chessboard.

Other activities can involve colors of the chessboard. Not only white and black, but also all types of opposite colors: light vs dark, for example, creamy vs brown or green or blue, yellow vs red, transparent vs smoked, silver vs gold, ivory vs onyx, etc. The teacher asks the pupils who are holding a black field letter to exchange places by running under the chess Klanza sheet. The black field letter means a letter which is next to the black field: a, c, e, g of the first line side and b, d, f, h from the eight-line side. We can follow the same pattern with numbers and opposite colors.

Some pupils can go under the chess Klanza sheet and stay under cover for three seconds. The instructions of the teacher can be as follows: Queen/'c' column, pawn/ figure line, odd/even line, etc. goes under the sheet. If children who are not in the set go under the Klanza chess sheet, they pay a forfeit. In order to recover the forfeit, they have to answer questions, e.g. What color is c3 field?, Which column/ half of chessboard is the Queen's/King's one? How many moves does the pawn have to make in order to reach the last rank and be promoted (“queening the pawn”).

3.2. Big garden chess mat

The second support, very useful for teaching chess by movement, is a big garden chess mat. It helps develop space orientation in children. The first type of activity consists in moving along lines or diagonals. This kind of practice can be organized in many various ways, for example: pupils can run, jump or walk on the balance beam (e.g. inverted benches). It can be done with some rhythm (e.g. counting fields on which they jump) or as a speed activity done by teams. The chess aim of these exercises is to learn to notice on the chessboard, not only lines referenced by letters or numbers, but also diagonals—black and especially white ones.

After this preparatory work, it is possible to introduce learning the way in which the chess pieces go. The order of introduction varies from one method to another, but, essentially, it is common to introduce pawn moves at first. The reason is that the pawn army can start fighting and this first simplified game is expected by pupils. Another reason is that, after having introduced the King moves, it is possible to practice “pawn endings”, which is a crucial ending at the final stage of the game.

Introducing the King allows one to explain the aim of the game and the inestimable value of the precious figure. In addition, one can show the force of the King at the end of game, due to the property of keeping a single field distance between two Kings. For children one field movement in any direction, at the beginning of the game when all figures are there, shows the weakness of the King. In the middle of the game, heavy figures are so impressive that kids can imagine that the King is unimportant. This is a wrong way of thinking because the whole strategy and tactics are King-oriented. The following exercises to demonstrate how the potential of the King can be proposed:

- moves by pairs of Kings—groups of four children play at a big garden chessboard. Two of them have the attributes of Kings and are supposed to make ten correct King’s moves, following the King of the opposite color. The other two oversee the moves of the Kings. If a player transgresses the rule of one square distance, they change roles with the observing child.
- playing “King square”—in order to control the pawn, at the final stage of the game, the King has to prevent the pawn from moving to the last line. This is done by keeping the pawn inside of the “King square”. At first, following the square rule, the children wonder if the King beats the pawn before the last line or not. Then, they test their hypothesis

by moving pieces/ themselves as chess pieces. The pupils play both the King and the pawn role in various starting positions.

- playing the final positions involving at first the Rook or the Queen and later pairs of Bishops.
- Another step of learning chess is showing the principles of moving the Rook and the Bishop. The move of the Queen will be a fusion of the two. The lines of moving the Rook are simpler than the Bishop's. They have their simple labels—letters or numbers. The diagonals, which are Bishop's moves, could be referred to as number and letter combinations. It is more complicated, because it is necessary to name the beginning and the ending squares of the chosen diagonal. In order to manage the level of difficulty, more exercises should be proposed for the Bishop's moves than for the Rook's ones, for example:
- the Rook power exercise—one or two children have to do the Rook's moves on the big garden chessboard. The remaining part of the group runs on the chessboard during a short song or a counting-out rhyme. When the song stops, they have to stay put on a chosen square paying attention to keep off the Rook's line of attack. The person who is closest to the Rook without the danger of being beaten takes the Rook to imitate its moves during the next turn.
- recognizing the diagonals—pupils put a colorful string on the big garden chessboard following the teacher's indications, such as putting the string along the longest black diagonal, the shortest white, d1-h5 diagonal, etc. This exercise can be followed by a physical one.
- following the diagonals—pupils follow the diagonals in different ways: walking on tiptoes, jumping on one leg, running, leaping like frogs or walking on the string trying to keep balance.
- Bishops' races—one group of children is the white-field Bishop team, the other is the black-field Bishop's. The aim of the race is to run across all the diagonals of the appropriate color on the chessboard. Each child runs along one diagonal and returns along another one, then the next member of the team follows suit. The race begins with the diagonal b1-a2 for the Whites and a7-b8 for the Blacks. The first player of the Whites runs along b1-a2 diagonal and returns along a4-d1 one, then the second player of the Whites continues by running along f1-a6 diagonal and returns along a8-h1 one. The next player follows h3-c8 diagonal returning along e8-h5 one. In the middle of the race the fourth

child has to change direction: s/he starts with h7-g8 diagonal and continues along c8-a6 one. Then the players carry on racing in the opposite direction until they reach the field h1.

In case an activity is quite difficult, so it would be advisable for the teacher to pursue the whole way together with the children in the Indian file. First for the Whites, after for the Blacks. The race of two colors at the same time could be difficult for the children and for the teacher to observe, so it is possible to measure the time of the race, separately for the Whites and for the Blacks, and indicate the winner team on the basis of the time results.

If an exercise cannot be completed simultaneously by different pairs of pupils, it can be done by a relay method. After completing one part of the task, one pupil gives a relay to another one queuing in a line, as it happens during sportive competitions in class.

The most complex chess piece, and most powerful in its moving possibilities, is the Queen. In order to visualize the Queen's offensive force, one child can disguise him/herself as the piece by putting a crown on his/her head. The child chooses one field on the big chessboard and the remaining kids have to place themselves on the fields which are not under attack. If somebody does not do this, the kid is "beaten". The beaten "piece" helps the Queen to grab other pieces by checking the lines and the diagonals she controls. The last pupil who remains on the chessboard (it could be two or three in order to make the play more difficult) becomes the Queen in the next edition of the game.

Other activities on the big chessboard have the function of visualization. If the teacher has to explain and help memorize some repetitive tactical movements, they can be performed by children on the big chessboard. For example, in the *one pawn endgame* (the last part in a chess game, when one color has one pawn and the King, and the opposite color owns only the King), the role of Kings and the pawn can be given to a different child. In this way, the players can have fun repeating the same procedure a number of times. This technique can be used for other chess problems, for example, the pinned piece, the double attack, the *tower bridge*, the triangulation, etc.³

As it was proved above, chess can be learned in an active physical way. Learning to play can also involve other integrated school subjects like Polish, art

³ Panopticum/Szachy by Jan Nowakowski is a complete web site providing detailed information about openings and short games. <https://panopticum.opx.pl/info/info.html>.

activities and, especially, mathematics. Such possibilities will be discussed in the next section.

4. Integrated skills through learning chess

4.1. Learning language & culture through chess

Chess has a big potential to instruct with respect to cultures and stories including universal motifs. Owing to over two thousand years of history and contact with multiple cultures, the cultural context, the record of precedencies or the languages linked with chess itself may serve as a rich source of legends, stories, poems and anecdotes.

There is, for example, a very popular legend about a king who would not learn to play chess. Instead, he liked to wage war. A wise man recommended that he would rather wage bloodless wars at the chessboard. In this example, chess has the role of saving the training of life, harmless for others. Another moral of this story is that if we are not prepared for real life, we can be ridiculed. A story like this can be used as a comprehension text and as a starting point of a discussion.

There is also a legend, which combines features of chess with mathematical characteristics. It is a legend about a wise man who taught chess to a sultan. The latter was amazed by the game and promised the wise man everything he wanted as a prize. The wish was apparently modest—he asked for the amount of rice/wheat/corn (it depends upon the region the legend as told) seeds that result from a calculation: adding up the successive results of number 2 (two seeds) raised to the power from 0 to 64 — because there are 64 cases of the chessboard. It appeared that it would be just one corn seed on the first chess square, two seeds on the second one, four, eight, 16... it did not appear to be such a large number, so the sultan agreed. How great was his surprise, when the wise man made him realize that he was not able to fulfill his promise. In fact, the complete number of seeds, even nowadays, surpasses thousands of times the annual crops of the whole earth.

This story shows that mathematics has the power to raise our thinking to unimaginable levels. In this way, the teacher can show to pupils that mathematics goes beyond their imagination and can help the think in chess.

Another way of using chess in language teaching is showing various terminology referring to chess in different countries. For example, if the teacher chooses

five countries like Poland, France, England, India and Russia; the names of the chess pieces change. The different names of pieces are connected with social and historical reality. This can be a pretext for the introduction of cultural differences to pupils. The differences of social organization, and especially the art of war, are shown by the names of King/ Shah, Queen/ Dame/ Vizier/ Hetman⁴, Rook/ Tower/ Chariot/ Boat, Bishop/ Jester/ Runner/ Elephant, Knight/ Cavalier/ Jumper/ Horse and finally pawn/foot soldier.

Chess was played initially in East Asia, then it came to central Europe from two different directions—from the West, thanks to the Arabic expansion, and from the East, from Russia. Depending upon the country, different modifications were made. In Poland chess terminology was influenced by both sources: the West (German *Runner*, French *Tower* or British common name of the *Queen*), the East (Russian *Vizier* stands for Polish *Hetman*, both signifying the *Queen* in the Western tradition) or especial the name of the *Jumper* (also having a common Eastern name of the *Horse* or *small Horse*). This truly central European location of Poland can exemplify how rich human tradition is, as it draws from many sources. This can be a starting point for the recognition of merits of individual cultures.

If the teacher is keen on working with speech sounds in the first or foreign language, the chess rules can be expressed by small rhyming forms or counting-out rhymes. It is a very appropriate form for training the memory of the seven-year-olds. These small forms can be developed into full theatrical plays based on a single chess game. During the rehearsals pupils learn some chess rules and perform as if they were chess pieces. In the Middle Ages, the theatrical plays based on chess were held at court as a form of entertainment. Nowadays, organizing them can be a great idea of a spectacle ending a school year.

Thanks to its long existence, the chess game can be an inexhaustible inspiration for language-focused work. Numerous anecdotes from chess players can illustrate human behaviors or attitudes. It is not all, there is also a mathematical dimension to explore.

⁴ Hetman was the main commander of the Polish military forces from the 16th to 18th century.

4.2. Learning mathematics through chess

The center of the mathematical activity is to solve problems, sometimes trying different ways, including wrong ones. Playing chess generates problematic situations challenging the players to find selected solutions from among many good ones. It can be accompanied by a presentation of arguments, followed by a discussion about possible consequences—which should stimulate pupils to gradually reason in an abstract way, at least, in later stages of their contact with chess.

The first mathematical concept that pupils face in the game are the numbers on the chessboard. They already know the integers, but writing them by hand is still to be developed. Numbering the eight ranks on the photocopied chessboard is a very useful exercise, especially when they have to do it from the perspective of the white pieces and next from the perspective of the black ones. Furthermore, the pupils can also make the chess notation on movements during a small exercise. The teacher gives pupils a diagram depicting a problematic situation and their task is to predict and note the next movement, e.g.: 1. Bc1-f4.⁵

Seven-year-old children, according to the instructions, perform mathematical compositions and decompositions. When they see the individual pieces and then count them, they can identify the chess army. Eventually, they can observe that pawns constitute *half* of the pieces. They likewise see that some pieces are *single* and others (i.e. Bishops, Knights and Rooks) are *double*, and that the armies of Whites and Blacks have identical composition.

The study of the four operations (addition, subtraction, multiplication, division) can be illustrated in chess by considering the piece value: one Bishop or Knight is worth three pawns, one Rook is worth one Bishop and a pawn, one Queen is worth two Rooks or Two Knights and a Bishop, and so on. The teacher can ask: What is the pawn value of the whole army, excluding the King?

In the battle simulation (studying taking action), it is possible to make a count of the army value after each capture.

The concept of multiplication is illustrated by chessboard *via* a small counting-out rhyme:

⁵ The chess notation is an important skill for students who will participate in tournaments where notation is mandatory. The introductory methodology to chess notation is presented in the author's guide for teachers but its rules can be found on the Internet, e.g. at Chessable blog. <https://www.chessable.com/blog/chess-notation-for-beginners/>.

eight by eight
is sixty four
I'm learning chess
on the ground/first/second floor⁶

Multiplication can be also practiced by exploring the extent of the movements of the Knight and the Bishop. The extent of the movements of the Knight depends mainly upon its placement on the chessboard and the presence of other pieces (especially of the same color) upon their landing square. In the Bishop's case, its position on the long or short diagonal is important and it also depends on the presence of other pieces on its trajectory. So, for example, the Bishop on the peripheral squares (band span) will have only seven movements possible (on the empty chessboard), but at center position it can reach 13 squares. It means its attacking possibilities are nearly doubled. In the Knight's case the disproportion is bigger: on the corner squares it reaches only two squares, and doing the "Knight rose" it reaches eight squares. It means his force is quadrupled.

Division can be mentioned at the moment of discovering the chessboard "geography": the player's and the opponent's half, the Queen's or the King's side, the center or the band span on the chessboard.

Finally, the game of chess constitutes an introduction to geometry. Lines or diagonals are explained with the piece's moves. Localization in two-dimensional space and introduction of the coordinates is necessary for the chess notation. The activity which can help this, in a very individual dimension, is to make each pupil an inhabitant of the chess world. The players have to throw an object (a small and flat one) at the garden chessboard, the square where the object lands becomes their homeland. In order to know the address of the "parcel", we use two crossing lines, one marked with a letter and the other marked with a number. The place where the two lines cross indicates a point where the object is.

The address of the square is formed by the letter marking the first line and the number marking the second line. In this way, pupils learn how to identify the localization in two-dimensional space. Another geometry concept is that of the set. The sets of objects belong to different categories. The pupils are asked to form sets based on a single feature, such as, colors, shapes, school objects

⁶ This counting-out rhyme was created by the Author of the present article and illustrates the way to fulfill different needs concerning vocabulary learning, mathematical topics or musical purposes.

(ruler, eraser, pen, pencil, sharpener, crayon, marker, glue), cuddly toys, etc. Pawns of each color can be replaced by a chosen set of other objects and the chess pawn exercise can be done with these objects.

In addition, at the primary level of education, memorizing the openings and endings of the game is a common way of studying chess. It helps young players to feel more comfortable. Another way to increase the memory capacity is by counting different variations of moves.

4.3. Learning Art activities through chess

Art activities connected with a chess topic can be various and depend on teacher know-how. Propositions below are examples operating on different kinds of art expression which can be a source of inspiration.

In order to develop small motricity, pupils can make gadgets for pawns or figures. These gadgets are useful both to play the role of the piece on the big chessboard or for a theatrical performance. Each pawn can wear white or black pendant made with a white or black medallion. Pupils cut out of thick paper a circle (for example, of 20 cm diameter), then glue the ribbon to hang it on the neck. They can also make crowns from a pattern (crowns with a cross for Kings, adorned ones for Queens) or swords for Knights and miters for Bishops (in the Polish version, it will be ancient looking rolls of letters).

If the concept of *Chessland* is developed, each kid becomes an inhabitant of the chosen parcel and s/he can decorate this square with her/his blazon. Other typical exercises are: coloring or drawing different pieces, then matching pictures with the pieces' initial position on the chessboard, linking pieces names to their icons (pictures of pieces can be borrowed from ancient or exotic chess illustrations). Different shapes of pieces, for example, formal two-dimensional shape, drawing, photo of Staunton classical pieces can be used to produce card games like "Seven Families" or "Old Maid."

Big motricity is developed by playing the roles of pieces—for example, movements of Kings in relation to each other, or playing the Knight in the center touching its reachable opponents. Simple gestures or mimicry can be enriched by a whole choreography: a dance can be performed by the King and the Rook at the castling occasion, a duel when a piece is taken. It is plausible to prepare the theater play, covering an entire short chess game, for the end of school year. The text of the play can include the master chess rules and if they have a rhyming form, they have the chance to be life-remembered.

Children can make pictures as an evaluation for chess activities. The presentation of their works is an occasion to express their feelings about the chess game and to provide the teacher with important feedback.

5. Conclusion

The chess game provides entertainment and offers great possibilities for learning. The game requires strategy, tactics as well as emotional, intellectual and physical preparation. The teacher can offer this to his/her pupils at the proportions s/he judges appropriate. In one case, the stress can be placed on physical education, in another on mathematical concepts. The main idea is to make them aware of the chess problems and, from the teacher's point of view, try to determine who is ready/motivated to study chess in the usual way.

In the future perspective, the whole project could be complemented by the introduction of a new element, namely the foreign language immersion. It has been proved that foreign language acquisition is more effective if it is based on a non-linguistic domain (language for special purposes). So, it is worthwhile to test learning effectiveness in the case of presenting chess content in a foreign language.

The benefits of the implementation of this project can vary. First of all, the pupils' motivation can increase because of this particular connection of two different dimensions: chess and a foreign language. Another benefit, promoted by the European Union, is the possibility to introduce this new learning method, combining learning chess and foreign languages, in each member state. This project can prove a workable means of encouraging young people to become enthusiastic about chess.

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