Chesscards: Making a Paper Chess Game with Primary School Students, a Cooperative Approach

Agnese Addone and Luigi De Bernardis

Abstract The game of chess can be too theoretical for children and can even be quite a challenge for teachers and chess masters. It is hard to make it approachable and, at the same time, technically correct. The *Chesscards* educational project arose from these observations, and is intended to be a way to translate chess theory actively, by tinkering with paper and colors. This delightful experience was conducted from 2015 to 2019 with 10-year-olds in a primary school in Rome, Italy, and enabled children to develop good chess skills by cooperating in making. Small groups of children aged 7–10 created playing cards and a paper chessboard along the lines of some of the most famous games. The initiative’s huge success, and the reason it was repeated in these last years, lies in its strictly constructionist approach to making: *Chesscards* became an original way to learn, and an easy social game that any child can play.

Keywords Chess · Making · Constructionism · Constructivism · Cooperative learning · Primary school · Tinkering · Pattern recognition · Social learning

1 Introduction

The idea behind this project is to get primary school students to play chess playfully and cooperatively.

They are introduced to the difficulties of the game, along with the rules and strategies. From the first experience in 2015 until 2019, the number of classes involved increased, and the project officially became one of our school’s main educational focuses. A book [1] and a paper [2] have been published on the workshop.

A. Addone (✉)

Department of Computer Science, University of Salerno, Fisciano, Italy
e-mail: addone@unisa.it

L. De Bernardis

Luiss Guido Carli University, Rome, Italy

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Both girls and boys achieved a good level of proficiency in chess, which was seen in their total autonomy in playing and in their participation in contests and tournaments at school and externally.

Chesscards is a making workshop where children design, color, cut and use their own cards, similar to the more famous Pokémon and Yu-Gi-Oh! games.

During school hours, the project always involves a class teacher and a chess master, one class at a time. This is an important setup, which maintains the link between theory and practice in the game of chess.

The children work in small groups to boost collaboration, cooperation [3] and participation. They enter a process of peer learning [4], which is central to the activity: the group's observation is essential to the success of the learning process [5].

The children achieve numerous skills in this experience: individual responsibility to the other members of the group, interdependence and a sense of having a common goal; review of each other's work; logical and algorithmic reasoning, social networking and team building; controlling negative or aggressive emotions.

The project was developed over four years and is still in progress. The number of children involved by year is as follows: 61 (2015/16), 251 (2016/17), 193 (2017/18) 200 (2018/19), 220 (2019/2020). We briefly describe a concrete example of application of the *Chesscards* methodology in a course organized in classes (10-year-olds) in a primary school in Rome, Italy. Our sample consisted of children aged 7–10 years; the ratio of males to females was more or less equal.

2 Making *Chesscards*

The first stage in the workshop is an introduction to the history of the game of chess and its development through the centuries in different countries. This is an essential step which focuses the children's attention on the game and explains its extraordinary position at the meeting point of games, sports, science and art.

During this phase, the chess master also introduces all the pieces, their different roles and values, and the basic strategies that are important to know to start playing. There is also great emphasis on the objective: conquering the center of the board. The teachers put the children into small groups and assigned a paper template to each child. The template is a sheet with several blank fields, an image of the piece, the name of the piece, a brief description of its value in points (3 for the bishop or knight, 5 for the rook and 9 for the queen) and how it moves, arrows indicating the direction in which it moves. At this stage the template is quite large (A4 format), to make it easier for the children to draw. Students are free to represent the piece in the central frame of the template as realistically as they want or using a metaphor or a symbol.

This is a very important stage, because it allows each child to express him or herself individually, and it is a kind of passport for obtaining the group's respect (Figs. 1 and 2).

Fig. 1 *Chesscards* template: name of the piece, caption/description, stars indicating its value, arrows indicating the direction of travel. The children can unleash their creativity within the rules of the game

Fig. 2 The three stages of making *Chesscards*: designing, cooperating, testing. First drawing, then the final version of the cards, when the game can begin on the chessboard

After a group discussion of the results and a peer review, the second step is to color the drawings. Much attention is given to how the stars and arrows are colored in, which has to be consistent with the rules of the game.

In the last step, the *Chesscards* are reduced and mounted onto white or black backgrounds, then cropped and laminated to protect them during play. It is essential for the background of the cards to be black or white: each player has a full set in one of the two colors.

Separately, children prepare a large paper chessboard, with squares the same size as the cards, and then place the pieces onto it.

Fig. 3 Two different versions of *Chesscards*: children use metaphors for their pieces. The stars indicating its value and arrows indicating the direction of travel of each piece are colored

Pairs of players are now formed and the match can start. Every child knows the rules and, if in doubt, can refer to the rules on the *Chesscards* so they can be sure they are moving correctly on the board.

To measure learning effectiveness at the end of the course, we ask children in the first few lessons to draw their own map, on a blank form. This also acts as our observation sheet, enabling us to identify weaknesses in their concepts about chess and which ones can be strengthened. The results are compared with those collected at the end of the course and are shown in the chart below. It is clear that the concepts that are missing are the different stages in the match (and the different strategies to be used in them), the center of the board and how the pieces progress. On the other hand, there is a very frequent misconception that the aim is to take as many of the opponent's pawns as possible. The concept of stalemate is not mentioned on any map (Figs. 3 and 4).

The children learned to play using their *Chesscards* on the board and were helped by the information written on the cards and the board. This information does not appear on a traditional board, but makes the process of learning the game easier for the children.

3 Outputs

Creativity is actively encouraged in this project. The children use their imagination and choose how to portray the subject, and can represent their pieces through symbol or metaphor. The most interesting results include characters in a castle, people in the street, country flags, fantasy characters and symbols. Each child has his or her own set of *Chesscards* and a board. Many exchange pieces or create a new set to exchange.

Fig. 4 Survey of learning effectiveness based on the problems raised in cognitive maps; each bar represents a node on the map, and is a key concept in the game

The constructionist approach [6] employed in the *Chesscards* project shows that learning by doing is vital. The maker approach may seem minimal here, but the children's active involvement and the results in educational terms are effective. By making their own cards, children become actors in their learning process and boost their motivation, engagement, accountability, and participation.

The social context plays an enormous role in the process [4]: the small group size is fundamental for achieving the best environment for constructing the game [3].

Playing with *Chesscards* is not so different from playing with real pieces, but the game is much more approachable for all children and teaches them the fundamentals of chess [7] in a fun and playful way.

References

1. De Bernardis, L., Corvi, M.: How a cooperative approach can improve children chess learning, 1st edn. Lambert Academic Publishing, Saarbruecken (2016)
2. Addone, A., et al.: Co-costruire le *Chesscard*: un'esperienza di apprendimento cooperativo degli scacchi in una scuola primaria. *Psicologia e Scuola* **47**(9–10), 58–61 (2016)
3. Johnson, D.W., Johnson, R.T., Holubec, E.J.: *Cooperation in the Classroom*, 8th ed., Edina, MN, USA (2008)
4. Vygotsky, L.S.: *Mind in Society: The Development of Higher Psychological Processes*. Harvard University Press, Cambridge (1980)
5. Darnis, F., Lafont, L.: Cooperative learning and dyadic interactions. *Phys. Educ. Sport Pedagog.* **20**(5), 459–473 (2015)

6. Kafai, J., Resnick, M.: *Constructionism in Practice. Designing, Thinking, and Learning in a Digital World*. Routledge, New York, London (1996)
7. Horgan, D.D., Morgan, D.: Chess expertise in children. *Appl. Cogn. Psychol.* **4**(2), 109–128 (1990)

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