Introducing Primary Students to Computational Thinking with a Giant Chess Board

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Menu

- Psycomotricity on Chess
- Computational Thinking in Education
- Activities at Kindergarten and Primary School
Psycomotrycity in Chess
Inspiration
Psyicomotricity

• The psychomotor practice is a fundamental element for a healthy development of the child, which is favoured by sense-motor play in which “the pleasure of acting enhances the pleasure of thinking” (B. Aucouturier).

• Furthermore, from last studies on neurosciences, it has been confirmed how psychomotor activity favours learning, speech development and abstract thinking, thus enhancing creativity and social abilities in children.
The PSG methodology has been used for several years at kindergarden and primary school in Fabriano (Italy), starting with Mauro Gaspari, a chess player and computer scientist.

The aim of the workshop is to let children approaching the world of chess with the same engagement they have when listening to a fairy tale, trying to enter it gradually, until they become part of it.
The Chess Board

Reversible Square 25x25 cm²
Scheme of activities

**begin** with an “Opening” sung rhyme while building up the chessboard

<Animated narration of a fairy tale>

<Sung rhyme relevant to the piece and presentation of its movement>

<Individual and group exercises>

**end** with a “Closing” sung rhyme and dismantling of the chessboard
Video

http://youtu.be/sUrT3MDpli4
Computational thinking
Computational Thinking

“Computational thinking is an approach to solving problems, designing systems, and understanding human behavior by drawing on concepts fundamental to computer science”

[Wing, 2006]

Thinking as a computer scientist
https://www.cs.cmu.edu/~15110-s13/Wing06-ct.pdf
Computer Scientist Skills

Someone who enjoys solving problems, and who can think analytically, can do well at computer science... The study requires mathematical aptitude, but mostly an ability to organize and to think both creatively and logically.

[Bill Freeman and John Guttag]
Computer scientist / Chess Player

These are the same requirements for a good chess player!
Activities
Construction and Destruction

Initializing

Constraints

Chessboard building

Problem solving

Debugging

„it is aweful!“
Square Perimeter Walk

The chessboard construction requires 64 squares to be arranged in a square perimeter, marked by four large black bands.

In this activity children were asked to prompt simple commands (Forward/Stop/Turn) which a blind teacher had to follow, to walk along the perimeter of the square, in such a way as to avoid “falling”. The children were then asked to try the activity themselves.
Graph Paper Programming
Graph Paper Programming

A sample algorithm:

> Step forward, change colour, step forward, return
> Change colour, step forward, change colour, return
> Step forward, change colour, step forward, return

In Paper: Change colour=Fill in
Graph Paper Programming

Step forward, change colour, return
Symbol-Action
Iteration
Meeting the King

Children resolved a secret message to help the White King joining the Black King.

In the pathway all chess characters are gradually met.
Meeting the King

Children A (male 5ys old)

Children B (female 5ys old)
Symbol-Action
Action-Symbol

Bee-Bot
Chess
Exploring Chess Boards
Reversible chess board

A Victorian Chequerboard Puzzle

http://www.puzzles.com/puzzlesin
education/handsonpuzzles/BattleRoyalT.htm
Pythagorean theorem
Conclusion
Conclusion

- Abstracting and decomposing a complex task
- Learning to be not ambiguous
- Finding the best way to solve a problem
THANKS!

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