



Visual Programming towards the Development of Early Analytical and Critical Thinking

¹Spiridon Tsalapatas, ²Hariklia Tsalapatas, ³Olivier Heidmann, ⁴Rene Alimisi,
⁵Chryssa Florou

htsalapa@uth.gr, sat@meliploe.com, Olivier.heidmann@gmail.com, ralimisi@gmail.com,
chflkorou@uth.gr

¹⁻²University of Thessaly, ³⁻⁴⁻⁵Centre for Research and Technology Thessaly (Greece)

Abstract

Analytical thinking is a transversal learning skill that helps an individual excel in wide areas, professional, social, civic, and personal. It facilitates the establishment of objectives, the evaluation of alternatives, and sound decision making. In academics, it offers transversal benefits independently of thematic area such as skilled reading, writing, reasoning, problem solving, and evaluation. Introducing engaging methods for building analytical thinking early in life can help children develop fundamental learning-to-learn skills with wide applicability in subjects ranging from science and technology to humanities and art and become active future citizens.

Despite the usefulness of analytical thinking throughout an individual's lifetime, development of the skill in early life in the context of primary school curricula is not representative of its importance. Current teaching avenues mostly deploy math, which provides a general theoretical background. However, they fail to leverage the inherent link between technology education and creativity, which emerges when children are encouraged to find innovative solutions through brainstorming and problem solving sessions.

This work deploys programming concepts as a means for developing analytical thinking among primary school children through wider blended learning that combines inquiry-based individual exploration and class collaboration. The advantages of the proposed approach are numerous: the precise, step-wise, and structural nature of programming is inherently analytical; it is deeply rooted in universal logic that exists in all cultures, transcends language barriers, and can bring learners closer through inclusive learning; it promotes methodological thinking, problem deconstruction, experimentation with alternative paths, and definition of a precise solution; finally, open-ended sandbox gaming approaches foster motivation, creativity, and entrepreneurial thinking; finally, activities can be integrated into existing school practices enhancing the learning experience.

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