

Conference Proceedings

CIVAE 2026

8th Interdisciplinary and Virtual Conference on Arts in Education

March 18- 19, 2026

Edited by MusicoGuia

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Visualization and art education through pattern blocks in the classroom of a secondary school

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Abstract

This poster presents an educational innovation experience focused on visualization and art education, implemented in the classroom of a secondary school using *pattern blocks* as teaching material (Riera, et al., 2015). The proposal is grounded in an interdisciplinary process that integrates mathematical and artistic contents (Gandfulfo & Lentinello, 2013) positioning the learning for transforming figurative images to geometric and visual compositions. The experience was developed as a practical workshop in which students, through a guided instruction progressively acquire the ability to understand and apply the concepts of “interpretation of figurative information” and “the visual thinking of information”, which take place when transforming an existing image into another (Bishop, 1989). This experience also states mathematical connections with some artistic aspects to reinforce geometric reasoning and spatial sense (Sánchez, 2025). Visualization acts as a core methodological tool for enhancing motivation and active participation, transforming the art classroom into a space for mathematical learning and artistic creation. D’Amore & Duval (2023) proposed three types of geometric and pictorial visualization addressing the recognition of closed shapes and contours, the third dimension and perspective, and the deconstruction of shapes and figures, respectively. For our purposes, we focused the experience to the first type of visualization. The use of teaching materials supports the understanding of abstract concepts, defining spatial sense as the ability to recognize, represent, and transform geometric forms in the plane (Flores et al., 2015). Furthermore, the integration of artistic references enables figurative interpretation to be approached as expressive resources rather than solely mathematical constructs, in line with educational approaches that link art and mathematics. The results show a positive student attitude toward interdisciplinary learning and an improvement in the understanding of geometric interpretation, highlighting the potential of using *pattern blocks* as educational innovation resources in Secondary Education.

Keywords: Visualization, Art Education, Geometry, Educational Innovation.

Visualización y enseñanzas artísticas mediante *pattern blocks* en el aula de una escuela de educación secundaria

Resumen

Este póster presenta una experiencia de innovación educativa centrada en la visualización y la educación artística, que se implementó en el aula de una escuela de Educación Secundaria Obligatoria utilizando *pattern blocks* como material manipulativo (Riera, et al., 2015). La propuesta se fundamenta en un proceso interdisciplinar aunando contenidos matemáticos y artísticos (Gandulfo y Lentiniello, 2013), situando el aprendizaje para transformar imágenes figurativas en composiciones geométricas y visuales. La experiencia forma parte de un taller práctico en el que el alumnado a través de una instrucción guiada, adquiere progresivamente la capacidad de comprender y aplicar los conceptos de “interpretación de información figurativa” y “pensamiento visual de la información”, los cuales toman lugar cuando se transforma una imagen existente en otra (Bishop, 1989). Esta experiencia también establece conexiones matemáticas con aspectos artísticos que refuerzan el razonamiento geométrico y el sentido espacial (Sánchez, 2025). La visualización actúa como herramienta esencial de la motivación y la participación al transformar el aula de Plástica en un espacio de aprendizaje matemático y creación artística. D’Amore y Duval (2023) propusieron tres tipos de visualización geométrica y pictórica que abordan el reconocimiento de formas cerradas y contornos, la tercera dimensión y la perspectiva, así como la deconstrucción de las formas y figuras, respectivamente. Para nuestros propósitos hemos enfocado esta experiencia en el primer tipo de visualización. El uso de materiales manipulativos potencia la comprensión de conceptos abstractos, entendiendo el sentido espacial como la capacidad de reconocer, representar y transformar formas geométricas en el plano (Flores et al., 2015). Además, la integración de referentes artísticos permite abordar la interpretación de imágenes figurativas como un recurso expresivo, en consonancia con propuestas que vinculan el arte y las matemáticas en contextos educativos. Los resultados evidencian una actitud positiva del alumnado hacia el aprendizaje interdisciplinar y una mejora en la comprensión de la interpretación geométrica, poniendo de manifiesto el potencial que tienen los *pattern blocks* como recursos de innovación educativa en Educación Secundaria.

Palabras clave: Visualización, Educación Artística, Geometría, Innovación educativa.

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Visualization and art education with pattern blocks in the classroom of a secondary school

Abstract

We present the works produced during a workshop for transforming figurative images to geometric and visual compositions. The workshop was given to third-year secondary school students with the aim of providing additional enrichment to their academic training and exploring mathematical connections between geometry and visual arts.

1. Visualization acts as a core methodological tool for enhancing motivation and active participation, transforming the art classroom into a space for mathematical learning and artistic creation.



Fig. 1. Students transforming figurative images.

2. For analysing images, Bishop (1989) described two visualization processes that can occur:

- “Interpretation of figurative information”. This is the process that takes place when attempting to read, understand, and interpret an image to extract information from it.
- “Visual thinking of information”. This is the process that takes place when converting non-visual information into images, or when transforming an existing image into another.



Fig. 2. Transformation of figurative images to geometric compositions with pattern blocks.

3. In recent years, D'Amore and Duval (2023) proposed three types of geometric and pictorial visualization:

- The first type addresses the recognition of closed shapes and contours, very common in geometry, painting, and mosaics.
- The second type takes into consideration the third dimension and perspective.
- The third type focuses on the deconstruction of shapes and figures, reducing them to a set of lines.

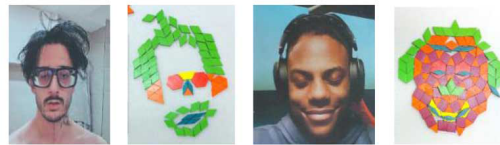


Fig. 3. Images with high grade of iconicity reduced to a simple composition of geometric elements



Fig. 4. Images with middle grade of iconicity reduced to a simple composition of geometric elements

4. Conclusions. The results shown positive student attitude toward interdisciplinary learning and an improvement in the understanding of geometric interpretation, highlighting the potential of using *pattern blocks* (Riera et al., 2015) as educational innovation resources in Secondary Education.

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