

Logifaces: a Game with many Faces

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Abstract

Manipulatives have been used for increasing student activity and improving learning outcomes in the classroom for years. However, teachers still face problems selecting and implementing manipulatives in classes. After researching relevant literature, our journey with Logifaces started with asking teachers to assess the possibilities of using the manipulatives in class. We moved on to testing Logifaces among students and carried out a survey among their teachers. To get a clearer impression on how Logifaces can influence the development of maths skills, e.g. geometry skills, we used it in a classroom setting with children diagnosed with mathematics learning difficulties. The fun and joy of using Logifaces and being creative in a form of geometric art can encourage teachers to change their beliefs about games being useless in education.

Keywords: Art, Mathematics, 2 Dimension, 3 Dimension, Teaching method, Manipulatives, STEAM, Science, Interdisciplinary, Experience Based, Playful Learning

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Introduction

The project "Analogue game for digital minds - Logifaces methodology"¹ is a STEAM-focused programme within the Erasmus+ programme. STEAM stands for the subjects of Science, Technology, Engineering, Arts and Mathematics. The Logifaces game integrates all subjects, and provides an interdisciplinary approach². Mathematical skills have especially high value in education due to their high value in the technological transformation of society³.

The European Council recommends certain skills as key competences for lifelong learning⁴. These recommendations were made to ensure accessible quality and inclusive education, training and lifelong learning. The aim is to develop and foster skills that allow active participation in society and working environments. The recommended skills include numerical, scientific and engineering skills, digital and technology-based competences, interpersonal skills, the ability to adopt new competences, entrepreneurship, as well as cultural awareness and expression. The application of 3D printing in education can help develop these skills and at the same time help develop ideas for use in maths education⁵. This is why we found this tool promising in our research. This specific technology is often used in prototyping or producing small quantities of products, such as manipulatives⁶. Manipulatives are physical objects that can be used to demonstrate or help investigate concepts, such as those taught in the mathematics classroom. Research suggests that using manipulatives may have a positive impact on student mathematics literacy and their understanding of mathematical concepts⁷. Furthermore, we believe that fun and motivation are crucial in early childhood education, so we chose a game as the object of our research. Studies have been performed that suggest that increased motivation and enjoyment have a positive effect on learning outcomes. Using games and manipulatives in the classroom is one possible way to achieve a motivational boost. One example of manipulatives that can be used in STEAM teaching is the game Logifaces, which is the subject of the project discussed in this text.

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