

Luis Fernando González-Beltrán  
(Organizador)

# Educação no Século XXI:

Perspectivas  
Contemporâneas  
sobre  
Ensino-Aprendizagem



EDITORA  
ARTEMIS  
2025

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## PRÓLOGO

El siglo XXI se define por la competitividad global, en un contexto lleno de desafíos urgentes, la sobrepoblación, la voracidad en el consumo de los recursos naturales, los problemas ecológicos, el desempleo, la exclusión social, etc. Algunas apuestas de solución se decantan por la calidad de la educación, por la generación de conocimientos científicos y la generación de valores éticos. Una población educada tiene mayor nivel de bienestar, tanto económico como en términos de salud. Por esta razón, nos preguntamos cuáles son los avances que se han logrado en el proceso de Enseñanza aprendizaje, que nos permitan abatir los rezagos en la educación en las zonas más pobres del planeta. Las respuestas nos deben llegar de diferentes partes del mundo, de múltiples autores, universidades y centros de educación. Tal es el objetivo que nos planteamos al lanzar la obra “Educação no século XXI: Perspectivas Contemporâneas sobre Ensino-Aprendizagem”, reunir muestras de todo el caudal de sabiduría que se desarrolla en estos momentos sobre este importante tópico, de forma que pueda tener mayor utilidad.

Ya no se trata de construir más y más escuelas, de contratar más y más profesores, sino buscar como transformar el escenario educativo para lograr mejores resultados. No hablamos solo de las tecnologías, sino de otros factores que trataremos aquí.

Estructuramos la obra en cinco apartados, el primero: “Reflexiones sobre el docente y la investigación educativa”, con seis trabajos teóricos sobre la necesidad de incluir valores desde la primera infancia; sobre el estado en que quedó el docente en la pandemia; la reflexión sobre lo que significa ser docente; sobre redefinir el papel del investigador educativo; un texto historiográfico sobre los principios ideológicos con los que se inició la educación en México; y un replanteamiento curricular en las escuelas de educación superior para un nuevo tipo de formación disciplinar que se requiere en los tiempos modernos.

La segunda sección denominada “La nueva práctica en Pedagogía” contiene cuatro trabajos, sobre el papel que desempeñan los pedagogos fuera de los contextos escolarizados; el papel de la coordinación pedagógica como referente en el contexto escolar; un estudio descriptivo sobre las habilidades comunicativas de los profesores en formación; y un estudio que insta a los educadores a incorporar la afectividad, la comunicación y la personalización para fomentar un futuro autónomo y democrático para los estudiantes.

El tercer componente “Uso de las Tecnologías en Educación” cubre también cuatro trabajos, uno analiza las habilidades tecnológicas, así como académicas, de los

“nativos digitales”. Los resultados muestran que, si se usan para el ocio, sus habilidades son excelentes, pero no así para su propio aprendizaje. El siguiente trabajo muestra la utilización de fenómenos de la vida real y las TIC para conectar con conceptos matemáticos complejos. Seguimos con una revisión sistemática sobre la Modelación Matemática en entornos de Realidad Virtual. El cuarto estudio demuestra que el uso de la inteligencia artificial generó dificultades en términos de originalidad que no tuvieron los alumnos que no usaron ninguna tecnología.

La cuarta sección la nombramos “Educación en contextos inciertos o empobrecidos” con cuatro estudios. Uno evidencia, a decir de los autores, “el racismo estructural presente en la sociedad”. El segundo presenta un intento por llevar la educación a las zonas rurales, se ensayó una especie de servicio social de una universidad pedagógica de Angola, para que instruyeran tanto a los niños sin escuela, como a los adultos analfabetas. El tercero demuestra que la baja pronunciada de la matrícula estudiantil a nivel universitario en Venezuela no debe ser atribuida como efecto exclusivo de la pandemia de COVID19, sino a cuestiones sociales y económicas. El último indaga sobre la presencia de los derechos humanos en el proceso de reclutamiento de personal.

Nuestra sección final “Formación docente en Bachillerato y Educación Superior” contiene siete trabajos, el primero analiza la comunicación intercultural, que logró beneficios varios, entre ellos aprendizaje constructivo y cooperativo, pensamiento crítico, y una mejora en sus habilidades lingüísticas. El segundo presenta el diagnóstico de necesidades de formación docente, como cursos sobre la salud emocional y física del docente de Ciencias y Humanidades. Continuamos con los resultados de los cursos de formación continua para los docentes sobre educación ambiental; luego tenemos un estudio sobre la investigación formativa, la que se lleva a cabo desde su preparación profesional buscando alcanzar autonomía y pensamiento crítico. En quinto lugar se discute la Open Science, que promueve el acceso libre a toda la información científica. También intenta saber si las universidades se añaden a esta propuesta y cómo lo muestran en sus páginas web. El siguiente estudio aplicó un cuestionario cuyas respuestas mostraron que muchas de las competencias en licenciatura se adquirieron durante la realización del trabajo de investigación. Finalizamos con una investigación que se realizó con el objetivo de analizar los hábitos de estudio que tienen las y los estudiantes de bachillerato para apropiarse del aprendizaje y su relación con los resultados obtenidos en sus evaluaciones.

Esperamos que esta organización los lleve a disfrutar mejor la lectura sobre estas perspectivas contemporáneas.

Dr. Luis Fernando González Beltrán  
Universidad Nacional Autónoma de México (UNAM)

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# CAPÍTULO 14

## THE INFLUENCE OF DIGITAL TECHNOLOGY ON CREATING ARTWORKS AT FINE ART CLASSES

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**ABSTRACT:** In the creative process, pupils come up with many ideas and solutions, hence it is important to choose the most original and appropriate ones. Developing creativity requires progressive encouragement of divergent thinking and critical thought, as one needs to go beyond the usual solutions and foster originality in using artistic techniques. Nowadays, pupils are exposed to many visual stimuli, including apps that offer image templates. While useful, these apps can often lead to using commonly suggested and well-known solutions, thus limiting creativity. This survey focuses on finding ways to encourage pupils to create original and authentic works of art, including with the use of digital technologies. The goal is to foster a sensitivity to artistic challenges and develop the ability to immerse oneself in imagined circumstances, which leads to richer and more imaginative expression. The survey questions focused on

how to prevent the use of template images in creative work and how artificial intelligence (AI) could help in this respect. The participants were pupils aged between 11 and 13. The first group addressed the art challenge without using digital technologies, while the second group used apps and artificial intelligence. The first group was more focused on the art challenge itself, on finding original solutions and successfully depicting them. The second group, however, struggled more in terms of originality and often resorted to imitation and templating, despite more opportunities for suggestion. The survey highlights the dangers of excessive imitation and the impact of digital technology on creativity and conceptions of art. The author will share the findings with teachers to improve the recognition of quality visual images in educational materials.

**KEYWORDS:** visual literacy; fine arts; creativity; digital technology; authenticity.

### A INFLUÊNCIA DA TECNOLOGIA DIGITAL NA CRIAÇÃO DE ARTES NAS AULAS DE BELAS ARTES

**RESUMO:** Este estudo investiga de que maneira as tecnologias digitais, em especial os aplicativos de modelos de imagem e a inteligência artificial, influenciam a criatividade no ensino de arte entre alunos com idades entre 11 e 13 anos. Foram observados dois grupos: um utilizando métodos tradicionais e outro, ferramentas digitais. Os resultados indicam



que o grupo tradicional produziu obras mais originais e com maior foco, enquanto o grupo que utilizou recursos digitais apresentou uma tendência à imitação e à dependência de modelos pré-estabelecidos. A pesquisa alerta para o risco de diminuição da criatividade decorrente do uso excessivo de ferramentas digitais e busca contribuir com educadores na promoção da originalidade e do pensamento crítico no ensino das artes visuais.

**PALAVRAS-CHAVE:** alfabetização visual; belas artes; criatividade; tecnologia digital; autenticidade.

## 1 INTRODUCTION

In contemporary society, we are exposed to large amounts of visual information on a daily basis, which is based on symbolism and various forms of visual communication. Understanding these messages requires specific cognitive processes related to visual thinking, with visual literacy playing an important role. The key question is whether it receives sufficient attention in primary education, as well as how often and in what ways it is dealt with. (Zupančič 2022). Digital technology has an undeniable impact on visual literacy, as visual communication has become ubiquitous in digital and print media, including textbooks and other learning materials. Iconographics such as the “thumbs up” as a sign of affirmation, “the heart” as a symbol of affection or “the rocket” as a sign of innovation have an impact on our understanding of visual content. However, not all visual representations are necessarily informative or meaningful, as some are merely decorative and may even be distracting. The purpose of this survey is to explore the impact of visual representations on pupils’ creativity in approaching art challenges. We hypothesise that certain visual stimuli may hinder or inhibit creativity and contribute to choosing stereotypical solutions for art assignments.

## 2 INTRODUCING DIGITAL TECHNOLOGY IN ART LESSONS

Digital technology is increasingly present in art lessons, opening up new possibilities for creativity, but also raising questions about its impact on the originality of pupils’ art projects. We will focus on empirical findings from observation and research. (Kunc 2026)

When it comes to using AI, we have observed generic solutions that follow certain visual patterns. For example, apps often generate visual images that conform to certain stylistic clichés. Floral patterns are typical for literature, birds to stimulate creativity, little men sitting at a table for project work, while blobs of colour and blurred details are used for art content.

When evaluating artistic value, we considered three components: clarity, originality and symmetry.

**Clarity** refers to the situation when something is perceived, understood and grasped. It is not defined only by the object of the artwork, but also by its overall recognition.

**An original work** is one that presents a completely new solution to an artistic challenge or a completely new solution in a group of related solutions.

**Symmetry** is expressed as an indefinable sense of harmony or as an aesthetically pleasing ratio and balance of all artistic elements that express perfection or beauty. (Jernejec, 2015)

In primary school, especially at the classroom level, encouragement for original creativity is often in short supply. When analysing art assignments on the theme of summer holidays, we have noticed repetition of stereotypical representations (the sun as a circle with rays as straight lines, spruce trees as equilateral triangles), which shows the influence of visual patterns that pupils acquire from digital media. When they are given an arbitrary motif, they resort to well-known motifs that have remained in their memory from browsing the Internet. Pupils often choose simpler art techniques and prefer to draw, whereas painting is preferred by those who have already mastered the technique.

### 3 SURVEY METHODOLOGY

The survey was carried out in a primary school among pupils aged between 11 and 13, with a total of 204 pupils taking part. Two groups were formed in each age group:

**Group A:** pupils worked without the use of digital technology.

**Group B:** pupils worked with digital technology.

Their art challenge was to paint the landscape in tone painting. We planned the lessons by defining the goals so that the pupils understood what they were going to learn and could therefore better concentrate on the learning activity. The lessons were structured according to the art curriculum, taking into account the following knowledge standards:

- a) The pupil distinguishes and uses different compositional solutions in their artworks.
- b) The pupil learns about tonal painting and applies it in a fine art assignment.
- c) The pupil constructs space in their artwork by using spatial keys and perspective.

The performance criteria were developed together with the pupils, so they were focused better and for longer on the work. As a result, the pupils were more motivated, not only in the production of their final artwork, but also in interim stages on the way to completing their task. (Černe Oven, 2022).

The performance criteria included clear requirements on the use of format, colour tonal structure, artistic technique and compositional principles, such as:

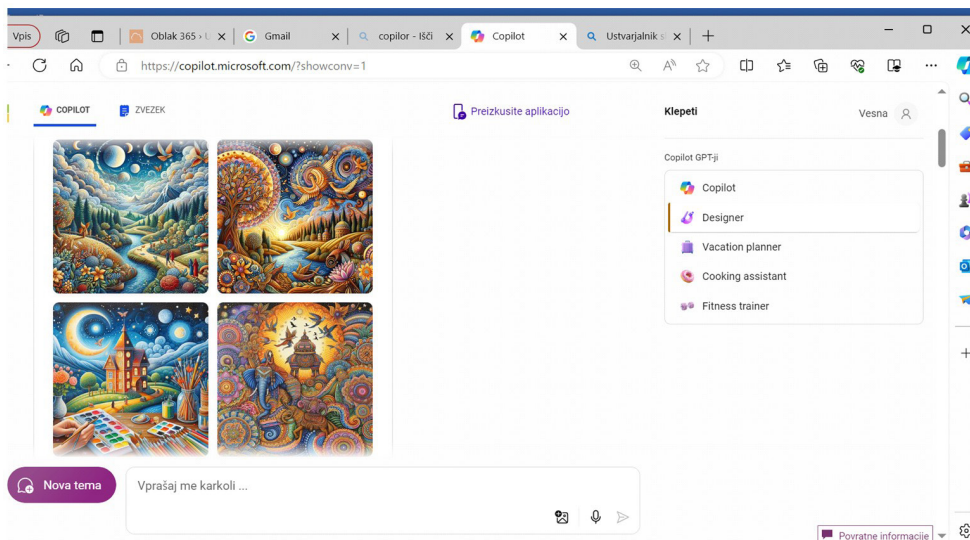
- a) one colour tone in at least twelve shades should dominate the picture;
- b) the use of tempera or watercolour;
- c) the composition should be arranged with well-defined spatial plans;
- d) a carefully designed background.

The first group of pupils was presented with an art challenge and given the criteria without the use of digital technology. The pupils were given a realistic art motif, a verbal description and visual material (i.e. reproductions). I provided a description of the picture with the criteria specified. They drew a sketch according to these criteria and then produced an artwork by using a specific art technique.

In the second group, I provided the pupils with criteria that included the use of digital technology, namely apps designed to generate images with artificial intelligence.

The performance criteria were entered in the Copilot application in the Slovene language. The first templates were images from a fantasy world.

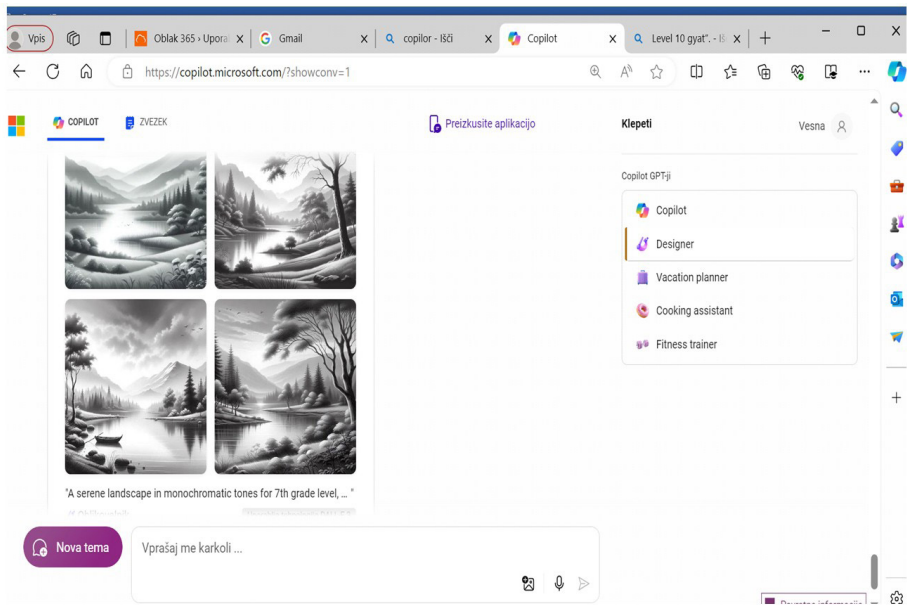
Figure 1. AI-generated landscape images.



Source: Microsoft Copilot, 2024, <http://www.microsoft.com>

Tonal painting, or modelling, is a way of painting with a single colour that is lightened or darkened. The lightening effect is achieved by adding white or a specific lighter colour. The darkening effect is achieved by adding black or a darker colour. (Butina1995). Artificial intelligence has produced images that match our criteria.

Figure 2. AI- generated images of a landscape in tonal mode.



Source: Microsoft Copilot, 2024, <http://www.microsoft.com>

Figure 3. AI- generated images of a landscape in tonal mode with 20 tones.



Source: Microsoft Copilot, 2025, <http://www.microsoft.com>

Below are two more examples of the use of artificial intelligence.

Figure 4. AI- generated images of a landscape in tonal mode in blue.



Source: Microsoft Copilot, 2025, <http://www.microsoft.com>

The evaluation and assessment took into account the degree to which the following goals were achieved:

- a) creativity and innovation,
- b) visual representation,
- c) artistic persuasiveness (harmony of artistic elements, compositional principles and coherence of motif, technique and artistic challenge),
- d) the consistency of the artwork with the art assignment (ability to complete an independent art task),
- e) technical or psychomotor skills (precision in relation to the materials and tools used),
- f) independence in working,
- g) the ability to evaluate one's own output and the output of classmates,
- h) curiosity and a willingness to accept artistic concepts and express oneself artistically,
- i) motivation for work or artistic expression, perseverance and consistency.

The assignments were evaluated according to the following criteria:

- a) an innovative solution to an art challenge (which is clearly visible in the artwork);

- b) evident innovative connection of the identified art challenge to other art concepts;
- c) evident innovative connection of the art challenge with the art motif and art technique. (Kocjančič 2016)

## 4 RESULTS

The pupils who painted after observing the real object (Group A) focused more on the art challenge, experiencing it more intensely and experientially. They searched for original solutions and successfully depicted them. Their artistic solutions were more original. The pupils took more time to create and observed the motif for a longer period of time. They made better use of the technique they applied. They used more layers of paint and made the spatial plans more precise. The shapes they created were more original and the trees, especially the spruce trees, were made realistic. The sky and the sun were depicted with tonal painting without clichéd forms. The pupils in group A concentrated better and for longer on their work.

The students in group B received more visual stimuli, associations and suggestions for solutions, but had more difficulties with the representation of the art challenge. During the lesson, the pupils were motivated to focus their attention mainly on the visual stimuli. In presenting the visual motif during the art assignment, students were motivated by the visual experience. The pupils often used an image to represent the visual motif, which they reproduced. They resorted to imitation and templating. These pupils depicted the visual motif in roughly the same way, their depictions often following the AI templates. Creativity was less pronounced in this group, as there was a tendency to imitate and use generic forms. They needed more encouragement from the art teacher, they were uncertain when painting and checked their work as they went along to see if it was suitable. They were less independent in their work. Most took 3 school hours to complete the assignment.

The students in the first group developed their skills of observation, spatial imagination and visualisation more intensively, while in the second group they worked on the basis of their visual memory and imagination.

When evaluating their achievements, three criteria were taken into account:

- a) Originality of the motif (independence and creativity in the choice of the depiction);
- b) Understanding of the artistic challenge (ability to apply artistic concepts in practice);

- c) Completion of the artistic assignment (technical and aesthetic perfection of the artwork).

We paid attention to whether the art assignments showed uncreative art solutions, whether no new solutions to the art challenge and the art motif were provided, whether the art solution was unimaginative and template-like, or whether the graphic image for the art motif was clearly taken from existing, well-known media graphic visual messages. The creative process is a particular challenge, limited to 45 min. Each week the pupils had to refocus on the art challenge and continue their artwork. We found that 45 minutes is not enough time to produce a drawing that allows for the process of transforming the artistic idea. In my opinion, a leap between sensory and mental creation takes place between the creation of the draft and the drawing. I was also interested in how the transformation of the artistic idea influenced the composition.

## 5 CONCLUSION

The results of this survey confirm that digital technology has an impact on the creativity and originality of artworks. While providing faster access to visual information and templates, it can also encourage imitation and limit individual interpretation of art assignments.

In the process of creation, pupils are confronted with many ideas and solutions, but only a few should be chosen that are the most authentic. In order to foster creativity, it is important to plan in stages and encourage critical thinking. It is essential to go beyond the usual solutions and encourage authenticity in the use of art techniques.

In this survey we analysed the impact of digital technologies on the development of pupils' creativity. Many apps offer ready-made templates, but this encourages imitation and reduces innovation. Every day, pupils are exposed to a variety of visual stimuli, which can affect their creativity.

The results indicate that digital technology influences aesthetic criteria and creativity, but often leads to the use of well-known templates. The objective of the survey was to steer the creative process towards authentic communication and expression. The survey raises questions about how art teaching in primary school shapes the perception of art and how digital technologies guide the stream of consciousness and influence the creative process.

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