

Thinking vs. Creating. Handmade vs digital (AI), good practices for generating new ideas in communication design, multimedia or audiovisuals projects.

Vítor Tavares¹ [0000-0001-9646-7040]

¹N2i, Polytechnic Institute of Maia, Portugal
vtavares@ipmaia.pt

Abstract

In today's context, we are living the digitalization paradigm, in which new digital Generative AI (Artificial Intelligence) tools are springing up at a frenetic pace. In the context of the higher education classroom, it can be seen that higher education students are increasingly looking to shorten the distance between the various relevant stages of the project challenges proposed by the teacher. They want to do it quickly and well. In most cases, the "thinking vs. creating" stage of the design methodology falls far short of what is expected. They prefer the dizzying speed of the answer suggested/given by ChatGPT or another Generative AI, rather than validating this content with research/analysis in credible sources (credible information sites or scientific articles), or through the teacher. The data/content generated by AI is often inconsistent and unreliable.

The act of thinking vs. creating is a cognitive act, exclusively human, because it is solitary, requires concentration, research and analysis of information obtained, on which critical and creative thinking is crucial, to raise with clarity and focus the materialization of the idea that the student proposes in the context of teaching-learning in the classroom. The design methodology proposed for design, multimedia or audiovisual work has four stages: first "briefing" - launches problem/challenge; Second: "thinking vs. creating" - creative process/ideation; Third: 'Materialization' - creation in the way referred to by Ellen Lupton (2016) in 'Intuition, Action, Creation - Design Thinking', Fourth: "Solution" - in this, it always presupposes three fundamental criteria in the final output of the work, originality, relevance and creativity. In a classroom context (practical-laboratory), students create, develop and materialize creative processes using mind maps and moodboards, made manually, in drawing and/or handwriting plans, in A2 format.

Initially, they question, they have doubts, because they simply aren't used to going "outside digital", or rather, to leaving their comfort zone, and they create some initial resistance to the process. In a second phase, they realize the relevance of this technique/working tool within the creative process. They then understand, more assertively and clearly, that good ideas don't just fall out of the sky. At the end of the creative process (Mind map), the students obtain very surprising results based on good teaching-learning practices with pedagogical innovation, as Godin (2023) reiterates that the magic of the creative process lies in the fact that it has no magic. Therefore, students are aware, on the one hand, that AI speeds up, automates and frees us from time-consuming stages of the creative process, on the other hand, it also requires the preservation of human cognitive function in the validation of its results.

In short, an online study/survey was carried out among higher education students in Portugal (polytechnic and university), attending courses in Communication Design, Multimedia and Audiovisuals, which resulted in a robust sample of 256 responses in total. It was found that 64.8% use ChatGPT; 28.9% use Copilot; 19.5 use Bing; 13.3% use Adobe Firefly; 11.7% use DALL.E; 5.9% use RunWay; 10.9% Midjourney; 10.2% use Bing, 11.3% use other AIs (figure3). However, in this study, a relevant question was also asked: if they check and analyze the content generated by AI, 41.4% considered doing individual critical reflection; 8.6% considered checking by peers or colleagues; 17.6% considered validating the results through the teacher; 14.5% considered checking through websites or online platforms and 15.2% considered checking through ChatGPT (figure4). In conclusion, the use of digital AI tools in co-creation processes at the "thinking vs. creating" stage in design, multimedia and audiovisual projects has proved to be very fruitful for students to develop their creative skills and competences.

Keywords: Creative process, AI, design teaching, communication design; multimedia, audiovisuals;

Acknowledgments: This work is funded by N2i, Polytechnic Institute of Maia, Portugal;

INTRODUCTION

The act of thinking vs. creating is a cognitive act, exclusively human, because it is solitary, requires concentration, focus, research and analysis of the information obtained, on which critical and creative thinking is crucial, so that, as a result, successful results can be obtained, that is, satisfactory, pertinent, creative and original. It's crucial to bring clarity and focus to the materialization of the idea that the student proposes in the classroom-teaching-learning context, boosting good practices to generate new ideas in communication design, multimedia or audiovisual projects. This article also seeks to encourage reflection on the tension between “thinking vs. creating” and how this is explored with students, with supporting evidence in images that are enriched with practical examples of pedagogical application.

The design methodology proposed in the classroom intentionally enhances the integration of Generative Artificial Intelligence (AI) in higher education, through which students can co-create with Generative AI, since it is well known that Generative AI tools are widely used by students to speed up ideation and production stages. However, recent studies warn of the risks associated with the indiscriminate use of these technologies. A study conducted by Microsoft and Carnegie Mellon University highlights that over-reliance on AI can compromise users' critical thinking and creativity, leading to a decrease in the cognitive effort required for complex tasks.

In short, it was two years ago this May that Open IA launched ChatGPT, and as João Sousa (2025) points out, it is becoming increasingly clear how exponential the evolution of this ecosystem has been and how it has offered the “world” a moment of epiphany about Artificial Intelligence (AI).

Neves (2025) on AI, Education and Critical Thinking makes a very pertinent and lucid reflection on the question: “What changes when students let AI think and “write for them? He says that on the one hand there is a “displacement of cognitive effort”, and on the other there is the latent risk of automated and superficial learning.

1 STATE OF THE ART

UNESCO, in its guide on generative AI in education, emphasizes the importance of a human-centered approach, warning of the risks of misinformation and the need for regulations that guarantee ethics and inclusion in the use of these technologies. In addition, UNESCO points out that while AI can be a powerful tool for personalizing learning and optimizing administrative tasks, it is crucial that educational institutions validate AI systems for their ethical and pedagogical suitability.

In Portugal, the integration of AI in higher education still faces challenges. The Instituto Superior Técnico (IST) recommends that the use of AI tools should be accompanied by direct interaction between teachers and students, ensuring the effective acquisition of knowledge and skills. In addition, it highlights the need to make explicit the AI resources allowed in assessments and to clarify the deontologically appropriate uses of these tools.

In the context of design, traditional project methodology emphasizes stages such as briefing, ideation, materialization and solution. The “thinking vs. creating” stage is fundamental, as it involves complex cognitive processes such as research, analysis and critical thinking. However, it is observed that many

students prefer to quickly resort to the solutions offered by AI, neglecting the depth and originality that result from a more reflective and manual creative process.

The Use of Artificial Intelligence (AI) in Higher Education Learning Contexts

Over the last two and a half years, Artificial Intelligence (AI) has consolidated itself as a digital ecosystem that is increasingly encompassing various areas of knowledge, based on advanced learning models. It has become increasingly apparent in the current context that Generative Artificial Intelligence (AI) has boosted digital creativity with a menu of advanced digital tools, such as GPT-4 (Open IA), Adobe Firefly (Adobe), DALL-E (Ramesh, 2022), when it comes to generating written content and/or images. However, when it comes to generating audiovisual content, Runway and Capcut have made it possible to generate increasingly realistic and impressive content.

In the projects proposed to students, the impact of the use of Generative AI in the process of co-creation in design projects and in the creation/production of audiovisual materials is an inevitable reality. The resources are increasingly enhanced, boosting the capacity for creative automation, making it more evident, as Marco Neves (2025) points out, a “displacement of cognitive effort”, whose learning results are notoriously “superficial”. However, it is very important to reflect on the importance of the ethical and authorial principles generated, namely the final outputs, which should always pass through the “sieve” of validation from credible and scientific sources in order to avoid plagiarism.

2 IMPLEMENTED METHODS

In order to consolidate the preparation of this article, two methodologies were actually implemented, the first, Methodology in Design and Audiovisual structured in four stages: 1. Briefing; 2. Creative Process; 3. Materialization; 4. Solution (figure 1).

The second was the preparation of a online survey submitted in the classroom to undergraduate and Master's degree students in the following scientific areas: Communication Design, Audio Visual and Media Production and Business Communication. This study/survey resulted in 256 sample responses (figure 2).



Figure 1 - Methodology developed by the author (2015)

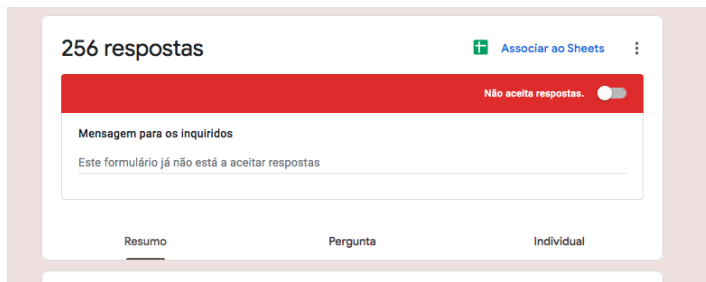


Figure 2 - Online survey (2025)

However, to investigate the impact of generative AI on the creative processes of higher education students in Portugal, an exploratory study was conducted with a sample of 256 students from Communication Design, Multimedia and Audiovisual courses, from various polytechnic and university institutions. The data was collected and analyzed from the online survey implemented in the classroom for students, complemented by classroom observations and analysis of work carried out by students in the creative process, namely mind maps and moodboards.

The first (previously mentioned) design methodology implemented (figure 1) in class followed four main stages:

- . *Briefing*: Presentation of the problem or challenge to be solved.
 - . *Think vs. Create*: Ideation and concept development phase, using techniques such as mind maps and manual moodboards in minimum A2 format.
 - . *Materialization*: Creation of the form, as described by Ellen Lupton in “Intuition, Action, Creation - Design Thinking”.
 - . *Solution*: Presentation of the final result, evaluating criteria such as originality, relevance and creativity.
- During the process, students were encouraged to step out of their digital comfort zone, despite their initial hesitations, exploring manual and reflective approaches to stimulate creativity and critical thinking.

The second, online survey, with a total of 256 sample responses.

2.1 Analysis of survey data

The results of the survey (figure 3) in response to the question “which Generative AI tools do you use” show that 64.8% of students use ChatGPT, 28.9% use Capcut, 19.5% use Copilot, 11.7% use DALL-E, 13.3% use Adobe Firefly, 10.9% use Midjourney, 10.2% use Bing, 5.9% use RunWay and 11.3% use other Generative AI tools. These data indicate a wide adoption of Generative AI tools by students, this sample shows that the majority have already adopted Generative AI, widespread use of these tools, in 95.5 of those surveyed.

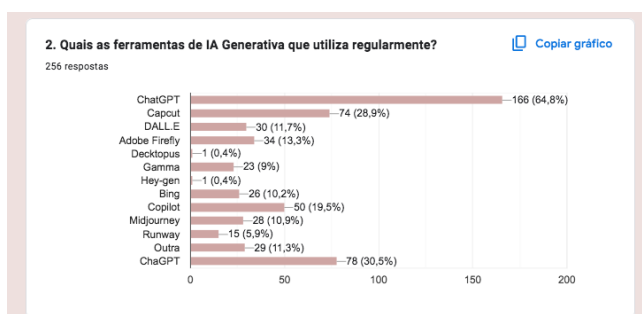


Figure 3 - Prepared by the author

However, when asked about the verification and analysis of the content generated by Generative AI (figure 4), in response to the question “what methods do you use to verify and validate the final results obtained”, 1.4% said that they carry out individual critical reflection. However, 17.6% resort to validation by the teacher/advisor. However, 14.5% use websites or online platforms, 15.2% rely on verification/validation via ChatGPT, and only 8.6% carry out verification/validation by peers/colleagues.

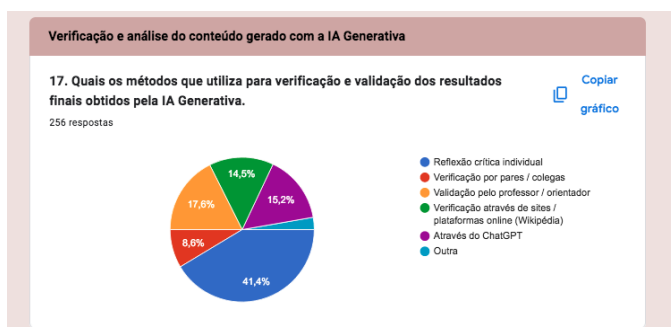


Figure 4 - Prepared by the author

When asked (figure 5) for what purposes they use Generative AI in Design and Audiovisual projects, the vast majority of students (65.2%) said it was for generating ideas, 12.5% for automating tasks, 10.2% for sketching and prototyping, and only 7.8% use Generative AI for other tasks.

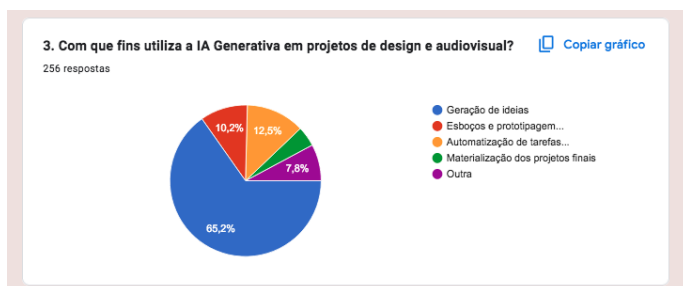


Figure 5 - Prepared by the author

However, when asked (figure 6) whether they think Generative AI will play an even more important role in the future and in co-creation processes, 31.3% said that it will be a great digital tool understood as a collaborative platform where participants from different areas can leverage their knowledge. However, 29.7% said that Generative AI will promote creativity and innovation. 18.4% will bring people together by breaking down language and geographical barriers. However, 15.2% believe that it will allow different cultural and social perspectives to be incorporated into design processes.

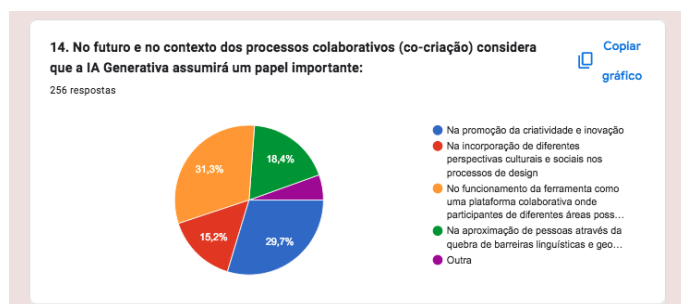


Figure 6 - Prepared by the author

These results, some predictable and others surprising in fact, suggest a worrying trend: many students rely excessively on the answers provided by Generative AI, without first carrying out an in-depth critical analysis and validating the final outputs with their teachers. This dependence can really jeopardize the development of essential skills such as critical thinking and creativity. Previous studies have already warned of the risks of excessive and sometimes inappropriate use of Generative AI, which can lead to a deterioration of cognitive faculties and subsequently a decrease in the ability to solve linear and basic problems. In short, finding alternatives to traditional writing to cultivate critical thinking is crucial. As Neves (2025) points out, fostering Socratic debate “requires defending a position, counter-arguing and adjusting ideas in real time”. The data was analyzed using Microsoft Corporation (2019). Microsoft Excel (Version 2019) [Software].

2.2 Critical Reflection

The implementation of methodologies that encourage manual and reflective approaches, such as the creation of mind maps and moodboards, has proved to be fruitful and effective in stimulating creativity and critical thinking. As did the implementation of the online student survey in class. The students initially showed some “resistance” to the development and physical materialization (A2 format) of the creative mindmap, as they were too “glued” and dependent on the digital screen of their personal computer in class. However, throughout the process, they recognized the importance of this exercise (figures 7 and 8), as a “good practice” in pedagogical innovation for higher education students in communication design and audiovisual projects. They also recognized that not only did they improve their conceptual/creative argumentation, but they also valued the depth and originality of their final works resulting from the creative process.



Figure 7 - images captured in the classroom, students from IPVC, UMAIA/IPMAIA and ISCE Douro

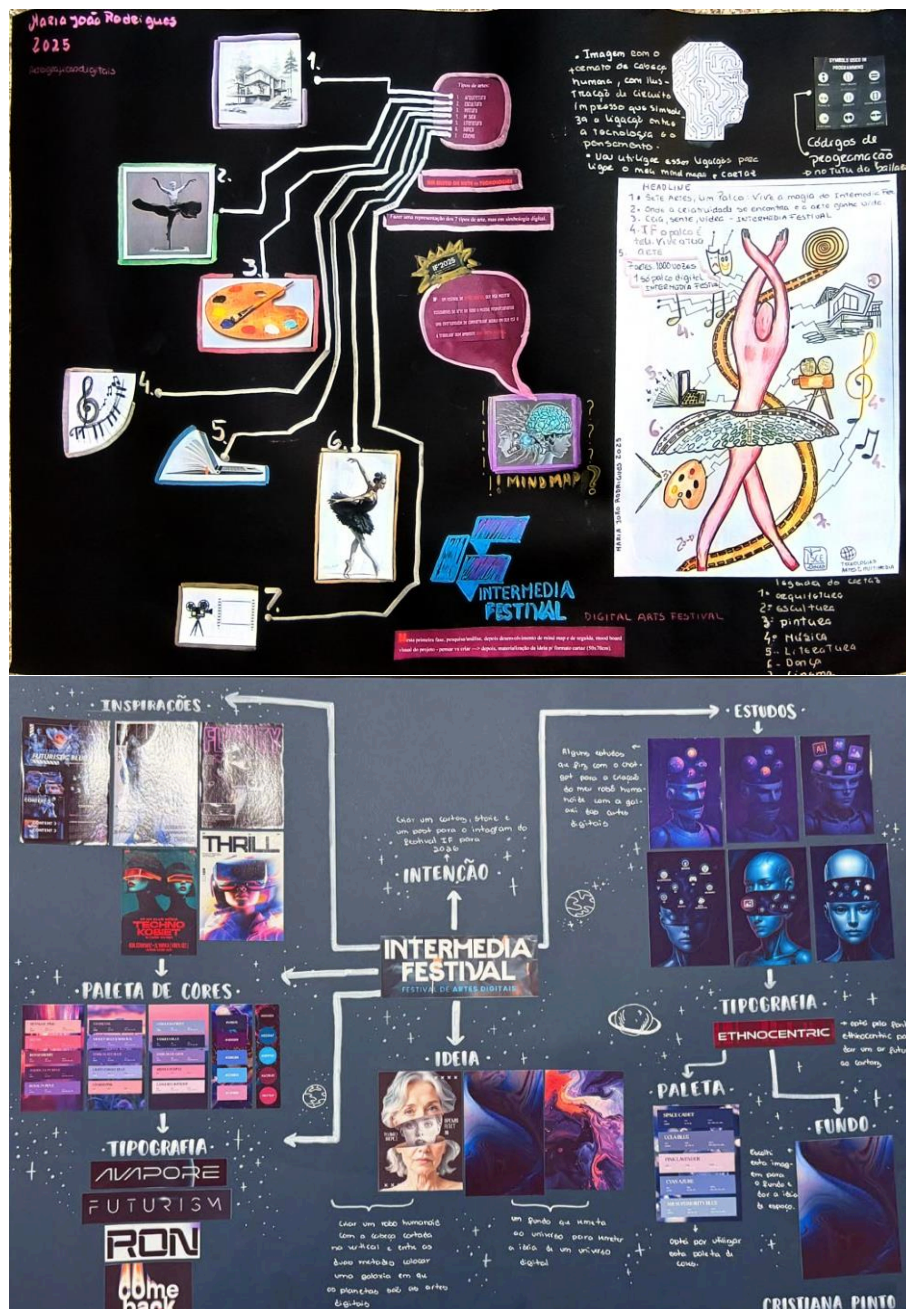


Figure 8 – Mindmaps images captured in the classroom of ISCE Douro students

3 CONCLUSIONS / FINALS CONSIDERATIONS

The integration of generative Artificial Intelligence (AI) into higher education offers significant opportunities to optimize processes and increase access to information. However, it is essential that this integration is accompanied by innovative teaching practices that encourage critical thinking, creative

thinking and reflection. Over-reliance on generative Artificial Intelligence (AI) tools can compromise the development of core competencies, becoming an obstacle to deep and meaningful learning.

The adoption of methodologies that combine digital and manual approaches, such as the creation of mind maps and moodboards, has been shown to be effective in stimulating creativity and critical thinking in students. However, their use at more advanced stages of projects can limit human creativity, sometimes generating generic or predictable results. These creative practices/methodologies can allow students to develop a deeper understanding of the problems and challenges posed by their teachers.

However, the student's individual critical and creative reflection is crucial, it is the main method of assessing the content generated, although validation by the teacher is the most preponderant and crucial.

In conclusion, AI should be seen as an innovative and useful complementary tool in academia, it can support and enhance the creative process, but it does not replace the importance of human critical and creative thinking in the development and materialization of creative and innovative solutions.

LIMITATIONS AND FUTURES STUDIES

The limitations of this scientific study were not substantial, although they may include some generic results. Nevertheless, this scientific study seeks to point out possible relevant insights with a view to amplifying new possibilities or avenues of scientific study in this field.

BIBLIOGRAPHICAL REFERENCES

Holzner, N., Maier, S., & Feuerriegel, S. (2025). Generative AI and Creativity: A Systematic Literature Review and Meta-Analysis. arXiv preprint arXiv:2505.17241

Wadinambiarachchi, S., Kelly, R. M., Pareek, S., Zhou, Q., & Velloso, E. (2024). The Effects of Generative AI on Design Fixation and Divergent Thinking. arXiv preprint arXiv:2403.11164.
Lupton, E. (2016). Intuição, Ação, Criação - Design Thinking.

UNESCO. (2024). Guia para a IA generativa na educação e na pesquisa.
<https://www.unesco.org/pt/articles/guia-para-ia-generativa-na-educacao-e-na-pesquisa>

Microsoft & Carnegie Mellon University. (2025). O impacto da IA generativa no pensamento crítico. https://www.microsoft.com/en-us/research/uploads/prod/2025/01/lee_2025_ai_critical_thinking_survey.pdf

Santo, E. do E., Souza Sales, M. V., & Carvalho Ottoni, A. L. (2025). Inteligência Artificial Generativa na Educação Superior: Aportes para uma Prática Pedagógica Crítico-Reflexiva. *Revista Interinstitucional Artes de Educar*, 11(1), 22–40. DOI: 10.12957/riae.2024.84894.

Benjamin, J. J., Lindley, J., Edwards, E., Rubegni, E., Korjakow, T., Grist, D., & Sharkey, R. (2024). Responding to Generative AI Technologies with Research-through-Design: The Ryelands AI Lab as an Exploratory Study. *arXiv preprint arXiv:2405.04677*.

Zheng, C., Yuan, K., Guo, B., Mogavi, R. H., Peng, Z., Ma, S., & Ma, X. (2024). Charting the Future of AI in Project-Based Learning: A Co-Design Exploration with Students. *arXiv preprint arXiv:2401.14915*.

Sousa, João (2025), E-Business, Tecnologia & Marketing Digital - E-commerce em revolução com Agentic AI, artigo publicado em *Imagens de Marca*, 11.06.2025 - <https://www.imagensdemarca.pt/artigo/e-commerce-em-revolucao-com-agentic-ai/>

Microsoft Corporation. (2019). Microsoft Excel (Versão 2019) [Software]. Microsoft. <https://www.microsoft.com/>

Neves, Marco (2025), IA, Educação e Pensamento Crítico, em *Decifra a IA*. publicado 16.05.2025 - <https://decifraia.beehiiv.com/p/ia-educa-o-e-o-pensamento-cr-tico>

Instituto Superior Técnico. (2025). Recomendações sobre uso da IA no Ensino Superior. <https://www.apdc.pt/noticias/atualidade-nacional/ist-faz-recomendacoes-sobre-uso-da-ia-no-ensino-superior>

Ramesh, A., Dhariwal, P., Nichol, A., Chu, C., & Chen, M. (2022). Hierarchical Text-Conditional Image Generation with CLIP Latents. DOI: 10.48550/arXiv.2204.06125 (<https://arxiv.org/abs/2204.06125>)

Hechinger Report, Proof Points: Offload critical thinking to AI (Mai 2025)
An existential crisis: can universities survive ChatGPT? — The Times (Mai 2025)
Lee et al., The Impact of Generative AI on Critical Thinking — Microsoft Research (Jan 2025)

P.PORTO

P.PIC'25

P.PIC
Porto Pedagogical
Innovation Conference

**17.07 —
18.07 2025**

PENSAR VS. CRIAR. MANUAL VS. DIGITAL (IA): BOAS PRÁTICAS PARA GERAR NOVAS IDEIAS EM PROJETOS DE DESIGN DE COMUNICAÇÃO, MULTIMÉDIA OU AUDIOVISUAIS

Vítor Tavares

N2i, Polytechnic Institute of Maia

DOI: <https://doi.org/10.34630/pel.v8i3.6379>

Palavras-chave: processo criativo, IA, ensino de design, design de comunicação, multimédia, audiovisuais

