

FROM THE PEDAGOGY OF RESISTANCE TO DIGITAL CONFORMISM: A STUDY OF ANALOG LITERACY IN A DIGITAL EDUCATION

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Abstract

This study explores the concept of analog literacy in the context of predominantly digital design education, addressing its relevance as a complementary and innovative pedagogical approach. The qualitative methodology consisted of exploratory interviews with five teachers and specialists in the field of design and multimedia from Portuguese higher education institutions. The analysis revealed three fundamental themes: processes, the role of error, and the hybrid approach. The participants pointed out that digital processes and tools, while efficient and productive, often hide creative processes and minimize the importance of error as an essential element of learning. In contrast, an analog workflow values material exploration and promotes patience, resilience, and critical thinking. The integration of analog and digital methodologies is presented as an effective pedagogical model that combines the efficiencies of digital with the depth and tangibility of analog, allowing for more reflective and creative learning. Based on the teaching and professional experience of the interviewees, this study presents the argument that analog literacy is not a nostalgic reminiscence, but an essential skill that should be developed in parallel and complementary to digital skills. This approach aligns with the Sustainable Development Goals (namely SDG 4.4) by promoting the development of technical and professional skills relevant to real work contexts and innovation. Its implementation in design education proposes an ethical and innovative response to the challenges of digital standardization, promoting diversity, innovation, and a culture of critical and reflective practices.

Keywords: *Analog literacy, education, design, reflexivity, creativity.*

1. Introduction

In the teaching practice of the design field (especially in recent years), we have been witnessing the growing contrast between analog practice and the digital context; digital, due to its speed, productivity, and infinite possibilities, has become essential in the contemporary world. Analog—in its multidimensional aspect—with weight, texture, and matter—is increasingly presented as a complex and slow medium, something that doesn't fit in with the times we live in, when digital design and production media and technologies offer us faster, apparently easier, and less expensive alternatives. The contrast between difficult and easy, slow and fast, analog and digital has become a central concern in my teaching practice. As observed by Pereira (2022), in the Portuguese binary higher education system (university and polytechnic), despite the diversity offered in the different groups of transversal skills, there is “no established doctrine of any kind” (p. 201). Despite considering the skills provided or to be acquired to be valid and stressing the importance of the material characteristics in training in Curricular Units (CUs) such as Projects, Workshops, or Laboratories given their experimental nature. Pereira admits that the practical, physical, or material nature can be reinforced, with the need and due access to laboratories equipped with the appropriate materials and tools. If, on the one hand, the Bologna Process* presupposes the creation of freer and more autonomous paths for students, the search for and access to the different methods — specific analog and digital — implies knowing the necessary skills. Although institutions have different approaches, the exploitation of materials in design education is at the root of it (Zhou and Rognolli, 2019).

Working manually—cutting, gluing, scratching, making mistakes, and starting again, respecting the time needed for tools and materials to fulfill their function and physically interact with each other—is

* <https://education.ec.europa.eu/pt-pt/education-levels/higher-education/inclusive-and-connected-higher-education/bologna-process>

not just a technical formality. It's a process that requires time, attention, knowledge, and a deep understanding of materials and creative processes, requiring preparation and reflection before and during the process on the part of the students. Analog and digital practices are not antagonistic; quite the contrary, digital tools mimic the analog reality in their processes, work tools, and even terminology. Digital tools should not be seen as a substitute for analog tools but rather as an extension of them, enabling designers to explore and manipulate materials in new ways, promoting creativity and innovation in design ideation and creation processes (Grigg, 2020, p. 202).

This research proposes to reflect on and problematize the place of the analog in a digital world, exploring how both approaches can (or cannot) coexist in a hybrid way to improve learning processes.

To contextualize this research, exploratory interviews were conducted with professionals and other teachers. This reflection is not about choosing between the past and the future but about knowing how to integrate the two strands—digital and analog—to improve the present.

2. Literature review

Literacy is understood as a way of identifying, understanding, interpreting, creating, and communicating in an increasingly digital, text-mediated, information-driven, and rapidly changing world. Literacy is a continuous process of learning and articulating knowledge in reading, writing, and the use of numbers throughout life and is part of a broader set of competencies, including digital competencies, media literacy, education for sustainable development and global citizenship, as well as specific competences for work (UNESCO, 2024).

The concept of literacy can also be broadened to include specific dimensions such as reading literacy, which represents students' ability to understand, use, evaluate, reflect on, and interact with verbal information to achieve their goals; mathematical literacy, which involves the ability to reason mathematically and to formulate, use and interpret mathematics to solve problems in real-world contexts; and scientific literacy, which translates into participation in reasoned discourse about science and technology, requiring skills to scientifically explain phenomena, evaluate and design scientific investigations and interpret data and evidence (OECD, 2023).

Thus, for this study, the definition of analog literacy is proposed as the ability to understand, use, evaluate, and create meaning through analog processes and tools, bringing together skills to interpret, manipulate, and communicate using non-digital media, to stimulate creativity, critical thinking and problem-solving in diverse contexts. These are fundamental skills that can be applied in various dimensions and can be reused and put into practice throughout the lives of students and future designers.

The choice of the term “analog literacy” reflects a conscious permissiveness, recognizing the absence of a consolidated definition in scientific literature. This designation was adopted for its ability to comprehensively synthesize the multiple dimensions that integrate the use of non-digital processes and tools in educational contexts related to art and design. The term conveys a clear intention to value materiality and tangibility as a counterpoint to the immateriality that predominates in the digital context, as it makes it possible to amplify and accelerate the process of artistic development in a comprehensive and integrated way [with other processes, namely digital] in a broader context of acquiring design skills (Olsen, 2024, p.129).

Otl Aicher explores the relationship between the concepts of analog and digital in graphic communication design, highlighting their interdependencies and cultural and philosophical implications. According to Aicher (2015), the interaction between the two concepts is essential to promote creativity and innovation, proposing that design should integrate both the sensory and qualitative aspects of analog and the structural and functional elements of digital. The author concludes that the balance between analog and digital is not only technical but also ethical and philosophical, arguing that the exclusive prioritization of digital can result in a reduction of the complexity of the human experience to simplistic metrics.

Jenny Grigg (2020) introduces the concept of material literacy related to the ability of designers to interpret and articulate meanings in the properties of materials, recognizing that materials, like words and images, constitute a form of design language. According to the author, material literacy involves haptic perception, expanding the designer's understanding beyond mere vision.

Material literacy in the context of teaching can enable students to develop a holistic understanding of materials, extrapolating their surface characteristics and recognizing their exploratory potential. Through hands-on experimentation, direct manipulation, and “conversations” with materials, students explore creative possibilities and integrate “thinking” and “doing” into the design process, recognizing the influence of materials on the formulation of ideas and their ability to generate innovative solutions (Grigg, 2020). This dialogue between student and material refers to Ingold (2013), according to whom making is understood as an active process of correspondence between the craftsman and the materials. From this perspective, knowledge does not result from the mechanical execution of previous plans but comes from

the dynamic and reciprocal interaction between thought, body movement, and the specific properties of materials (Ingold, 2013; Grigg, 2020). The integration of this experimentation (materials, techniques) must be in-depth and not just incidental or haphazard in the learning process (Skulmowski and Rey, 2018), since high physical involvement is linked to educational gains. However, it is necessary to recognize that there is a risk of cognitive overload and that not all students, or contexts, are prepared for a high level of interactivity.

The material knowledge acquired in educational contexts occurs subtly and implicitly, through embodied practices that articulate tacit and explicit forms of knowledge (Budge, 2016). Embodied learning takes place between the dynamic and reciprocal material dialog between the student and the active materials (Groth & Nimkulrat, 2025). This dialog highlights the central role of materials as active agents in the creative process, continuously guiding and influencing the development of students' thinking and actions, contributing to the construction of deep, tacit, and explicit knowledge that goes beyond superficial and merely technical educational approaches (Groth & Nimkulrat, 2025; Ingold, 2013).

3. Methodology

The methodology adopted for this study is qualitative, utilizing exploratory, unstructured interviews carried out through personal communication. Five professors and specialists from the fields of design and multimedia participated, all actively teaching in Portuguese higher education institutions (universities and polytechnics). Participants were selected based on their experience and recognition in the areas of digital design, typography, illustration, editorial design, and media arts, providing a comprehensive perspective on the role that digital and analog tools and processes literacy for visual communication design. The purpose of the interviews was to understand the participants' perceptions and experiences regarding the use of analog practices and their relationship with digital contexts in design education.

The interviews were conducted openly, facilitating a fluid and reflective conversation. Interviews were carried out via telephone during the first weeks of December 2024, and notes from the conversations were sent by email to all participants for validation of the discussed content.

Data analysis followed an interpretive approach, identifying common themes and patterns within the responses.

4. Results and discussion

The findings derived from this study highlight three central themes concerning the role of analog processes within contemporary design education: the intrinsic educational value of analog methodologies, the significance of error as a critical component of the learning process, and the advantages presented by adopting hybrid approaches that integrate analog and digital practices.

Firstly, analog methodologies emerge as exceptionally beneficial for fostering deeper, embodied experiences among students. An Associate Professor specializing in Digital Design and Typography articulated that the value of manual processes transcends the tangible results, emphasizing their importance in facilitating reflective practice, enhancing process awareness, and promoting meaningful experiential learning. The slower pace inherent in analog practices is advantageous, providing students the necessary temporal space for deeper internalization of techniques and conceptual thinking. Similarly, an Assistant Professor specializing in Illustration and Picture Books emphasized the effectiveness of initiating students' training with purely analog techniques, such as watercolor, charcoal, and inks. This methodological foundation proved crucial in enabling students to grasp essential principles like scale, dimension, and spatial relationships.

The second critical theme that emerged from the analysis is the educational significance of error within analog processes. Interviews underscored that mistakes and unforeseen outcomes are integral to analog methods, enhancing students' abilities to creatively respond to challenges. According to an Assistant Professor in Typography and Editorial Design, students engaging in digital processes often bypass valuable experimentation phases due to the immediacy and ease of correction provided by digital tools. This tendency was contrasted with analog approaches, where errors become explicit, tangible, and challenging to quickly rectify or ignore. Thus, students learn valuable lessons in resilience, patience, and adaptive problem-solving. This notion is supported by another Assistant Professor currently pursuing doctoral research in Digital Design, who pointed out that analog contexts inherently necessitate confronting and actively integrating mistakes into creative workflows, thereby significantly enriching the learning experience and fostering critical thinking.

Thirdly, the data illustrates substantial benefits arising from the strategic integration of analog and digital methods. Specialists across various design domains—including Digital Design, Typography, Illustration, and Media Arts—highlighted hybrid methodologies as a particularly effective educational

strategy. The rapid and productive capabilities of digital tools complement the reflective and explorative characteristics of analog methods, creating a balanced, inclusive, and comprehensive pedagogical model. One Assistant Professor in Audiovisual and Media Arts stressed that the combination of analog and digital practices enhances students' critical awareness, encouraging more intentional, thoughtful interactions with tools and materials. A balanced pedagogical model is particularly critical given the diversity of student interests and motivational profiles, ensuring inclusivity and broad relevance.

Furthermore, participants raised concerns regarding students' diminishing ability to perceive scale and dimension accurately when working solely in digital environments. An Assistant Professor noted how students frequently designed large-scale posters on smartphones without fully grasping the implications of their design choices due to limited visibility. Such digital limitations underscore the critical role analog practices play in grounding students' spatial and material understanding. Moreover, digital tools, despite their convenience, were criticized for potentially contributing to superficiality and reactive, rather than proactive, creative behaviors. Consequently, an Assistant Professor in Audiovisual and Media Arts recommended cultivating a more critical stance toward technological tools, emphasizing understanding and deconstructing digital workflows rather than merely using technology as an end.

The implications of these findings are significant for contemporary design education. Educators are encouraged to foster environments where analog practices are actively integrated into curricula, providing students with opportunities for meaningful material interactions and reflective practice. Acknowledging and valuing error as an inherent aspect of learning not only destigmatizes failure but also highlights its potential for pedagogical enrichment. Moreover, adopting hybrid analog-digital methodologies strategically cultivates versatile, critically reflective designers capable of adeptly navigating between traditional craft techniques and contemporary digital technologies.

5. Conclusion

Analog literacy within a predominantly digital educational context is a concept that warrants closer reflection. It is not simply about promoting tools or methodologies, but rather ways of promoting critical thinking and creation/design in educational contexts. Digital technologies are faster, more productive, and sometimes perceived as easier to handle. However, their use can be superficial, immediate, and insufficient regarding a critical and responsible understanding of creative processes and the achievement of outcomes. Conversely, analog technologies are slower, eminently sensory, fallible, and, precisely for these reasons, profoundly emotional and human.

The capacity to analyze, react, reflect, and incorporate error within the process and/or outcomes—or its absence—was a highlighted viewpoint shared by all interviewees. As emphasized in one of the interviews, in a digital context, it often appears that the deviations in the process itself have no place. Whereas in analog contexts, errors and accidents are considered essential components of the making and learning journey. Digital processes and technologies present themselves as immediately perfect, yet they diminish the opportunities for their users, particularly students, to explore and learn from their mistakes. In contrast, analog media involve procedural and tactile knowledge, based on direct interaction with materials. This approach demands time, dedication, and patience, enabling an embodied cognition of the properties and limitations of materials. Moreover, it encourages experimentation and the incorporation of error as an active part of the learning process.

Although there is no conclusive evidence that adopting more physical and analog processes or techniques, involving embodied learning, directly leads to improved educational performance, the literature and data gathered from interviews appear to confirm that the use of a minimal or moderate level—avoiding cognitive overload or facilitating its adoption by students—of analog approaches involving physical, sensory, and embodied manipulation of materials and tools in the design process appears to correlate with cognitive benefits and improvements in educational outcomes in design.

Integrating analog literacy into educational processes does not represent a nostalgic vision of the past; rather, it proposes a model that combines analog and digital media for a more comprehensive and responsible understanding of digital means and processes. This approach does not center on technology as an end in itself but rather on the human experience; it aims to achieve, promoting creativity, critical thinking, and a deeper understanding of materiality, facilitated by hybrid methodologies (analog-digital). The homogenization produced by digital conformism can be mitigated through analog literacy, promoting diversity, innovation, and a culture of reflective and critical practices.

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