VISUAL REVIEW | Vol. 18, No. 8, 2026 | ISSN 2695-9631

International Visual Culture Review / Revista Internacional de Cultura Visual

https://doi.org/10.62161/revvisual.v18.6518

IMAGE THEORY LEARNING WITH GENERATIVE ARTIFICIAL INTELLIGENCE (*TEXT-TO-IMAGE*)

Prompt Battle as an Innovative Methodological Strategy

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KEYWORDS

Generative AI
Prompt
Prompt Battle
Image Theory
Text-to-Image GenAI
Higher Education
Prompt-based Learning

ABSTRACT

This research aims to design, implement, and evaluate a prompt battle as a methodological strategy to enhance the understanding and consolidation of key concepts in image theory. Methodologically, the prompt battle is grounded in problem-based learning, collaborative learning, gamification, and prompt-based learning. The study describes its design and implementation in the course Image Theory of the Bachelor's Degree in Audiovisual Communication, presents the results of the analysis of 1,070 prompts, 110 evaluative prompts and images, student voting, and a final survey, and examines the limitations of generative AI.

RECEIVED: 16/ 06 / 2026
ACCEPTED: 29/ 10 / 2026

1. Introduction

Rapid advances in artificial intelligence (AI) in recent years have had a multidimensional impact on contemporary societies. In the sphere of higher education, although the use of AI dates back to the previous decade, interest has intensified following the emergence of tools such as ChatGPT in 2022 (Heredia-Carroza and Stoica, 2023). Its adoption has gradually expanded across disciplines since then and has supported different educational applications (Wang et al., 2024), most notably through the generation of experiences aimed at fostering personalized and adaptive learning (Kabudi et al., 2021; González-Campos et al., 2024).

As with any technological innovation, its integration into higher education has encountered resistance (Bearman et al., 2023; Yusuf et al., 2024). The emergence of generative AI (GenAI), defined as "a branch of artificial intelligence concerned with creating original content from data or instructions" (Mayol, 2023), although it has sparked considerable academic interest (Guettala et al., 2024), has also led many international educational institutions to ban or reject tools such as ChatGPT or DALL·E (Heaven, 2023). However, authors such as Bearman et al. (2023), Hashmi and Bal (2024), and Freixas-Flores and Solas (2025) emphasize the need to integrate these tools into higher education and to embed related competencies within academic curricula in response to a changing labor market.

Within the process of integrating GenAI into higher education, this article examines the educational potential of prompt battles (PB), conceived as competitive activities in which participants demonstrate proficiency in prompt design—that is, the creation of textual instructions for interacting with GenAI systems.

The PB format was developed by Sebastian Schmieg and Florian A. Schmidt in collaboration with students from HTW Dresden in 2022. It consists of a live event in which participants compete by generating images from text using a GenAI system. Since its inception, more than thirty PB events have been organized in various countries. The competition is structured into time-limited elimination rounds, during which pairs of players compete by testing their creativity and ability to formulate prompts. This process entails understanding the morphological, dynamic, and compositional configuration of an image, as well as the functioning of the specific GenAI system, in order to generate visual hypotheses and effective prompts. Since GenAI systems typically generate multiple images from a single prompt, contestants must select one proposal to submit for audience voting. The player who prevails in most contests advances to the subsequent round, and the competition proceeds until a final winner is determined.

1.1. Theoretical Foundation of PB

The emergence of PB is associated with the rise of text-to-image GenAI and the development of promptism (CCCB, 2024). In the first case, this technology enables the generation of visual works from textual descriptions, producing a new type of technically mediated image shaped by language. Its use requires competencies in translating visual, compositional, and narrative concepts into text, thereby reinforcing its educational value in contemporary visual literacy (Serra and Oliveira, 2025). In educational contexts, integrating GenAI facilitates experimentation, critical visual analysis, and a deeper understanding of its interpretative and technical limitations (Leitfaden Promptathon, 2024).

In the second case, promptism refers to an emerging cultural and creative practice that positions prompt formulation at the core of the creative process. The prompt moves beyond its purely instrumental role, functioning as an expressive and discursive space that articulates language, image, and technology (Schmieg et al., 2022). In contexts such as PB, it also assumes a performative and pedagogical dimension, fostering visual and critical thinking while challenging traditional notions of authorship in AI-mediated creation (CCCB, 2024).

Additionally, the prompt functions not merely as a textual instruction for interacting with GenAI systems, but also as "a way of structuring knowledge, anticipating responses, contextualizing intentions, and modulating AI behavior" (García-Beltrán, 2026, p. 2). From a pedagogical standpoint, it serves as a cognitive tool that makes processes of reasoning,

interpretation, and decision-making explicit. Its design, therefore, involves the deliberate translation of conceptual and visual intentions into structured language, positioned at the intersection of critical thinking, creativity, and AI literacy (Serra and Oliveira, 2025).

Given the relevance of these indicators, it is essential to address prompt design (Serra and Oliveira, 2025; García-Beltrán, 2026) and to understand different types of prompt modifiers applicable to an educational PB. Drawing on the study by Oppenlaender (2024), the following types of modifiers can be identified: contextual, which incorporate contextual information; compositional, aimed at detailing the morphological, dynamic, and scalar elements of the image; stylistic, linked to aesthetics, visual languages, or authorial references; conceptual, focused on the representation of abstract ideas; narrative, which introduce actions or temporal sequences; and negative or restrictive, intended to limit the behavior of the IAG system. Regarding the structure of all this information, current prompt-engineering approaches recommend integrating context, goal, description, style, and constraints in a clear and hierarchical way, thus enhancing both output precision and users' metacognitive reflection (Park and Choo, 2024).

2. Objectives

The primary objective of this study is to design, implement, and evaluate a PB as a methodological strategy to promote students' understanding, application, and consolidation of core concepts in image theory. Building on this, the following specific objectives are proposed:

SO1. To design the rules, modalities, and challenges of a PB aimed at fostering both the theoretical and practical foundations of image theory.

SO2. To develop an assessment system derived from the dynamics of a PB in a university classroom setting.

SO3. To explore the potential limitations of GenAI for implementing a PB applied to the learning of image theory.

3. Methodology

Integrating GenAI into the university requires new methodologies and methods to understand, analyze, and critically leverage its educational potential. In image studies, GenAI contributes a distinct dimension to contemporary visual literacy by introducing forms of production mediated by language and algorithms. In response to this challenge, a methodological strategy based on a PB has been developed, framed within active learning methodologies and incorporating distinctive features such as student-centered learning, constructivist learning, teamwork, ICT use, and critical thinking (Asunción, 2019). Drawing on Cantador's (2016) proposal, the PB is grounded in problem-based learning (PBL), collaborative learning (CL), gamification, and prompt-based learning (PtBL).

Initially, the PB adopts a PBL approach through modalities and challenges that integrate various learning objectives in image theory. Each challenge poses a visual-theoretical problem that students address iteratively: they formulate a visual hypothesis in a prompt, test it by generating an image with a GenAI system, analyze the result in relation to the challenge, and refine the prompt to improve the visual proposal. This procedure fosters critical thinking through students' parallel analysis and evaluation of the prompt, reflecting on acquired knowledge, and the generated image, which challenges the GenAI system's behavior based on their instructions.

From another perspective, the PB also incorporates CL, grounded in a socioconstructivist epistemology (Bruffee, 1993), in which knowledge is primarily generated through negotiation, meaning construction, and peer-to-peer reformulation of ideas, with the instructor and learning context playing a supportive role (Roselli, 2016). Group participation in PB, beyond fostering greater cohesion among students, serves intragroup purposes by promoting individual responsibility and commitment through understanding the challenges and generating well-crafted prompts. It also encourages positive group interdependence, requiring students to share and negotiate visual hypotheses, collectively analyze prompts and GenAI outputs, and select, from the set of images generated by the group, the one that best aligns with the objectives of each challenge. Likewise, collaborative learning extends to the intergroup level through student voting.

The third approach involves gamification, defined as the "use of game design elements in non-game contexts" (Deterding et al., 2011). As Castañeda (2025) notes, gamification in educational contexts can enhance intrinsic motivation and participation, emphasizing that "the most effective approaches combine competitive dynamics with collaborative components" (p. 671). Taking these considerations into account, and drawing on the game elements identified by Contreras-Espinosa and Eguia-Gómez (2024), PB has been designed using the following game elements (Table 1).

Table 1. Game Elements Used in the PB

	Game elements
Dynamics	Emotions: competitiveness, frustration, curiosity, etc. Progression: student development. Relationships: social interactions (intragroup and intergroup). Restrictions: limitations regarding the tool's use and temporal constraints.
Mechanics	Challenges: tasks designed to integrate multiple learning goals in image theory. Competition: intragroup and intergroup competition. Rewards: benefit gained from successfully addressing an objective in a notable manner. Player collaboration: combined action toward a shared objective. Voting: students' preference for a particular visual proposal.
Components	Leaderboards: overall ranking achieved by each student or group across the different modalities and challenges. Levels: competition modalities with increasing difficulty. Teams: student groups working toward a common objective. Time limit: competing within a predefined time frame.

Source: own elaboration, 2026.

Derived from students' interaction with GenAI, the PB also incorporates prompt-based learning (PtBL). Although this approach has not yet been extensively theorized (Serra and Oliveira, 2025), prompts constitute a novel form of learning construction. According to Buitrón et al. (2025), prompt formulation "represents a pedagogical paradigm that develops reasoning, problem-solving, and creativity capacities" (p. 8484). This interaction involves designing, evaluating, and refining prompts, constituting "an externalization of the metacognitive dialogue" (Buitrón et al., 2025, p. 8493) that reveals students' internal processes as they apply acquired knowledge in a specific subject. To support this iterative process and optimize GenAI outputs, the PB was designed based on an adapted version of the IDEA prompt-engineering framework (Park and Choo, 2024).

Table 2. IDEA Model Applied to the Prompt Battle

Step	**Considerations**
(I)nclude essential elements and articulate a creative and meaningful formulation	Describe the context, composition, style, narrative, and concepts that make up the image, adopting a creative approach.
(D)evelop concise prompts	Formulate clear prompts with explicit instructions, as well as negative or restrictive prompts, in order to gain greater control over image generation.
(E)valuate results and refine prompts	Analyze the resulting image and optimize the prompt by reformulating the less consistent segments.
(A)pply responsibly	Approach the creative process from a responsible and ethical perspective.

Source: adapted by the authors from Park and Choo (2024), 2026.

3.1. Design and Implementation of the Prompt Battle

Following the guidelines of Cantador (2016), the PB was developed within a constrained time frame; integrate a diversity of topics, employing seven game modalities with various learning objectives, as well as a final non-competitive modality for students to evaluate the experience (Table 3); create a learning context in which all participants could succeed; and, finally, award a symbolic prize, in this case consisting of peer recognition through applause.

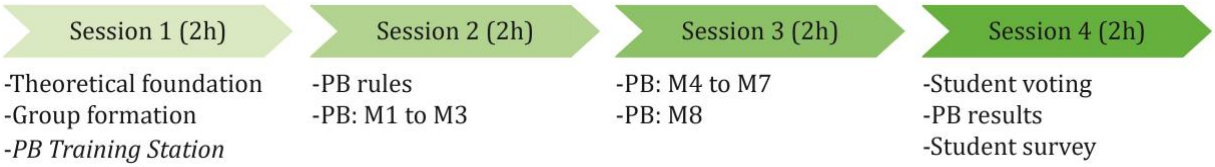
Table 3. Learning Objectives of Each PB Modality

Modalities (M)	Learning objectives
M1. Prompt modifiers	Introduce students to different prompt modifiers while addressing concepts and elements from image theory.
M2. Creation	Apply basic foundations of image theory from a creative perspective.
M3. Intermediality	Examine the image as a phenomenon constructed in relation to other media, languages, and systems of representation by applying the three subcategories of intermediality proposed by Rajewsky (2005).
M4. Reproduction	Analyze and describe images to reproduce them with the GenAI system as faithfully as possible.
M5. Collaborative (mutant prompt)	Collaboratively understand and apply the basic principles of image composition, as well as the use of morphological and dynamic elements.
M6. Alternative gazes	Explore the limits of traditional perspective through the possibilities offered by GenAI.
M7. Sequential image	Develop a visual narrative through more advanced prompting that incorporates sequential syntax and narrative coherence.
M8. Evaluation	Evaluate students' experience in the PB through image creation.

Source: own elaboration, 2026.

The PB was implemented during the first semester of the 2025/2026 academic year in the Image Theory course, taught in the first year of the Bachelor's Degree in Audiovisual Communication. A total of 64 students participated, and the PB was conducted over four consecutive sessions (Figure 1).

Figure 1. Development of the PB by Sessions



Source: own elaboration, 2026.

The first session was devoted to student training, introducing the theoretical and practical grounding of the PB. This included an overview of text-to-image GenAI, promptism, and the concept of the prompt, as well as types of modifiers and their structure. The formation of groups then proceeded, resulting in a total of 13 teams, each composed of five members except for one, which had four. All participants had access to either their own device or one provided by the faculty, in addition to Whisk, Google's free GenAI tool used for the PB. Following the concept of the Prompt Battle Training Station (Schmieg, n.d.), the final part of the first session was dedicated to introducing students to Whisk through a series of simple, untimed exercises.

In the second session, the first three competition modalities were conducted (Table 4) following a prior explanation and summary of the PB rules, as outlined below:

1. Participation in the competition occurs in groups of five members.
2. The PB comprises seven game modalities, each containing distinct challenges.
3. The tool used by all participants is Whisk, restricted to the text-to-image function rather than image-to-image.
4. The available time is 5 minutes per challenge.
5. At the end of each modality, each group must select one image per challenge from among all their creations to enter the competition.
6. All images are compiled in a group-shared text document on OneDrive.
7. Each image must include the full name of the student who created it, the corresponding modality, the challenge number, and the prompt used for its generation. The images selected for the competition are marked in this document with the label "competition image."
8. Images missing any of the above information are disqualified.
9. At the end of the event, all participants vote by selecting the images that best meet the established challenges.
10. Students must not vote for images submitted by their own group; otherwise, their votes are invalid.
11. Each challenge has a single winner, and each modality is won by the group receiving the highest number of votes.

12. The PB is won by the group that accumulates the highest number of votes across the seven modalities.

13. In the event of a tie, the instructor selects the image that most effectively fulfills the objectives of the corresponding challenge and/or modality.

14. At the end of the competition, a leaderboard is created to present the winners based on students' votes.

15. The winning team is recognized by their peers through applause.

Table 4. PB Modalities and Challenges of the PB

Modalities (M)	Challenges (C)	Time
M1	C1. Generate an image using a narrative prompt that conveys a strong sense of rhythm within the image. C2. Generate an image using a conceptual prompt integrating Roland Barthes' concept of punctum. C3. Generate an image using a stylistic prompt (free mixing).	15 minutes
M2	C1. Following Justo Villafañe's (2006) iconcity scale, create an image combining at least two different levels of reality. C2. Create an image whose signifier carries multiple signifieds. C3. Create an image incorporating a central perspective to structure the spatial composition, with gradients that highlight the initial and final elements.	15 minutes
M3	C1. Convert a *haiku* into an image with tension and/or rhythm (medial transposition). C2. Generate an image hybridizing languages and aesthetics from different media forms (media hybridization). C3. Generate an image containing an explicit intermedial reference (intermedial references).	15 minutes
M4	C1. Reproduce an image (visual weight through isolation). C2. Reproduce an image (radial symmetry). C3. Reproduce an image (rhythm and types of lines).	15 minutes
M5	C1. Generate an image in which a morphological point coincides with the horizon line. C2. Turn that point into a vanishing point. C3. Keeping the previous structure, insert a shape midway between foreground and background. C4. Emphasize the previously created shape over the other elements by using color. C5. Balance the resulting composition and add rhythm to the image.	25 minutes
M6	C1. Create an image with multiple vanishing points in conflict. C2. Create an image that includes recursive spaces, that is, frames nested within infinite frames. C3. Generate an image integrating a collective point of view.	15 minutes
M7	C1. Create a sequence of three images with temporal ellipsis, each using a different shot type to generate rhythm. The story must follow the classical Aristotelian structure: setup, conflict, and resolution.	15 minutes
M8	C1. Evaluate the PB through an image integrating both positive and negative aspects. C2. Create an image that reflects the knowledge acquired in the PB in relation to image theory.	10 minutes

Source: own elaboration, 2026.

In the third session, the process was repeated with the remaining five modalities (Table 4), noting that the eighth modality was non-competitive and aimed instead at evaluating the students' experience in PB.

For the fourth and final session, a Google Forms questionnaire was prepared, containing the images selected by each group for every modality and challenge. The form was distributed to students via a hyperlink and QR code, enabling them to vote for the images they considered most successful in addressing the various challenges of each modality. Following the voting, the

results were shared to determine the winners of each challenge, each modality, and the overall competition. Students then completed a survey to evaluate their experience in the PB.

3.2. Evaluation of the PB and Students' Experience

Adopting a mixed qualitative and quantitative approach, the evaluation of PB is based on a triadic system comprising the analysis of all prompts from the seven competitive modalities, the analysis of prompts and images from the non-competitive evaluative modality (M8), and student voting. In the first case, a specific analysis template was created (Table 5) to evaluate the 1,070 prompts generated by the students using a Likert-type scale with the following levels: poor, needs improvement, acceptable, very good, and excellent.

Table 5. Description of the Variables Employed to Analyze the Prompts Generated by Students

Variables analyzed	Description of the variables
Theoretical adequacy	Degree to which the prompt fulfills the theoretical objective of each challenge.
Image composition	Control over the arrangement and interconnection of the main visual elements in the image.
Prompt length	Prompt length without redundancy or noise.
Prompt clarity and constraints	Accuracy and lack of ambiguity, together with the implementation of constraints to exert greater control over image generation.
Originality	Creation of innovative visual solutions or complex visual ideas.
Sequential syntax and narrative coherence (M7 only)	Continuity and visual language, along with the narrative consistency across the image sequence.
Ethical responsibility	Level of student commitment to ethical principles in image generation.

Source: own elaboration, 2026.

Thereupon, the tandem of prompts and their corresponding images from M8 (57 and 53 images generated in the first and second challenges, respectively) was inspected to identify and analyze the positive and negative indicators noted by the students.

Finally, the voting results were analyzed to examine the degree of alignment between the evaluative judgments made by the students and the learning objectives of each modality and challenge. To this end, students' votes on the 188 images that entered the competition were examined according to three possible categories: conceptual error, basic objective fulfillment, and full objective fulfillment. These categories made it possible to identify not only the appropriateness of the selected images but also the level of rigor implicit in the evaluation criteria applied by the students.

Additionally, a questionnaire (59 participants) was conducted at the end of the competition, consisting of two distinct sections that enabled the contextualization of the educational effects of PB. The first section comprises two questions using a five-level Likert-style psychometric scale (none, very low, low, medium, high, and very high) to assess the degree of prior knowledge and use of IAG. The second section consists of six Likert-type questions with four levels (strongly disagree, disagree, agree, and strongly agree), allowing students to reflect on PB and express the positive and negative aspects they identified.

3.3. Evaluating Limitations of the GenAI System

The analysis of the educational limitations of GenAI draws on the study of the 1,070 prompts and images generated by students, allowing for the identification of structural trends in the system's responses when used as a tool to reinforce and support learning in image theory. Based on these data, four dimensions are analyzed to identify the limitations of GenAI within the context of the PB: (1) semantic understanding, which examines the extent to which the GenAI system correctly interprets abstract concepts related to image theory; (2) technical limitations, which explore the degree of consistency of the morphological elements present in the image; (3)

interpretative limits due to saturation, which address the extent to which the GenAI system interprets all the instructions expressed in a prompt; and, finally, (4) visual consistency in sequential images (limited to the 60 prompts and images obtained in M5), which allows for the analysis of the degree of visual continuity across multiple images generated from the same prompt. To examine each dimension, a five-level Likert-type scale ranging from deficient to excellent was used.

4. Results

4.1. PB Evaluation: Prompt Analysis

Prompt analysis shows a tendency toward medium and high evaluation levels in students' formulation of textual instructions for GenAI-based image generation (Table 6). Overall, the results demonstrate an adequate appropriation of the image theory foundations integrated into the PB and a progressive development of specific prompting-related competencies, while also revealing significant differences across the evaluated dimensions.

Table 6. Results of the Analysis of Student-Generated Prompts

	Poor	Needs improvement	Acceptable	Very good	Excellent
Theoretical adequacy	7.2%	15.33%	13.74%	16.63%	47.10%
Image composition	5.89%	24.58%	32.52%	21.21%	15.79%
Prompt length	10.47%	30.84%	24.02%	15.79%	18.88%
Prompt clarity and constraints	9.72%	24.95%	29.15%	22.05%	14.11%
Originality	6.45%	16.91%	35.23%	21.50%	19.91%
Sequential syntax and narrative coherence (M7)	0%	7.02%	20.47%	15.79%	56.72%
Ethical responsibility	0%	0.47%	0.19%	0%	99.34%

Source: own elaboration, 2026.

Notably, the translation of theoretical concepts into prompts shows a high level of consolidation. The strong concentration of scores in the very good and excellent levels suggests that, in most cases, students were able to translate abstract conceptual frameworks into operational textual instructions aligned with each challenge's objectives. This indicates that the PB supported an effective link between theory and practice, turning the prompt into a space where theoretical knowledge is made explicit. Nonetheless, the non-negligible percentage of prompts at lower levels indicates that this process was not uniform and that some students faced initial difficulties in expressing these concepts in text.

Regarding composition and control over visual organization, results tend toward intermediate levels. Acceptable and very good evaluations predominate, suggesting a functional command of basic compositional principles, albeit with limitations in the construction of complex spatial relationships, element interconnection, or more advanced visual dynamics. This pattern is also reflected in prompt length, as the results show a persistent difficulty in striking a balance between conciseness and descriptive exhaustiveness. In many cases, prompts are excessively concise, reducing control over the visual outcome, or excessively long, as they include redundancies that add no real value or introduce noise into the image generation process.

Accordingly, the clarity of the instructions and the use of constraints aimed at restricting or guiding the behavior of the GenAI system are predominantly situated at intermediate levels. While most prompts display a clear and functional structure, the systematic application of explicit constraints, especially negative prompts, remains insufficiently consolidated. This aspect points to a developing competence that requires greater pedagogical attention, as it is key to increasing the level of control and precision in image generation.

In terms of originality, the results are largely positive, showing a notable proportion of high ratings. This aligns with the PB's methodological approach, which promotes exploration, experimentation, and the generation of diverse visual hypotheses. Nevertheless, the weight of intermediate ratings indicates that originality often occurs within relatively conventional visual frameworks, highlighting opportunities for further enhancement in future implementations of the experience.

A particularly relevant result appears in the sequential-image modality (M7), where most prompts reached high levels of narrative coherence and visual syntax. This finding suggests that working with sequences of images promotes more rigorous prompt planning and a heightened awareness of the temporal and narrative dimensions of visual language, aspects that appear to encourage a more precise and reflective use of text as a visual design tool.

Concerning ethical responsibility, it reaches nearly absolute values at the highest levels of the scale, indicating that students acted critically and conscientiously in image generation, respecting fundamental ethical principles and avoiding problematic content. This underscores the importance of explicitly integrating ethical considerations into GenAI-related teaching practices.

4.2. Analysis of Evaluative Images (M8)

Turning now to M8, the images and prompts (57 in total) corresponding to the first challenge reveal a remarkable diversity of represented indicators (Table 7). Within the proportion corresponding to this set (68.42%), positive indicators are primarily associated with students' satisfaction of the experience, the creative component of the activity, and theoretical learning. Satisfaction emerges as a cross-cutting theme that shapes much of the visual output, manifesting through images that suggest progress and achievement. This indicator is reinforced by the recurring presence of direct and indirect references to creativity in both the prompts and the images, suggesting that students perceive PB as a conducive context for visual experimentation and idea generation.

Table 7. Analysis of M8 Prompts and Images

(M8) Challenge	Contains positive indicators	Positive indicators	Contains negative indicators	Negative indicators
R1	68.42%	Theoretical learning (23.07%) Learning about AI (10.25%) Collaborative learning (10.25%) Overall satisfaction (48.71%) Creativity (17.94%) Educational innovation (5.12%)	78.94 %	Time-related stress (80%) Confusion (6.66%) Frustration (17.77%) Technical frustration (4.44%)
R2	92.45%	Theoretical learning (75.51%) Learning about AI (32.65%) Collaborative learning (2.04%) Creative learning (16.32%)	11.32%	Stress in learning (11.32%)

Source: own elaboration, 2026.

Theoretical learning occupies a relevant place among positive indicators, though less prominent than satisfaction. In addition to being explicitly stated in text, this learning is also represented in the images through symbolic or visual references to concepts specific to image theory, indicating that students are able to identify and isolate conceptual content even when the task is not explicitly designed to demonstrate it. Alongside this, indicators related to learning about GenIA and collaborative work also appear, though with a more moderate presence. This

distribution suggests that, in evaluating the experience, students tend to prioritize a holistic understanding of the activity over specific technical or relational aspects.

In parallel, Table 7 reveals a significant prevalence of negative indicators in this initial task. From the observed percentage (78.94%), negative indicators are predominantly associated with time-related stress, which stands out as the primary negative factor. The recurrence of this indicator underscores the central role of time constraints in the experience of the PB and suggests that this aspect is easily translatable into visual language. Other negative indicators, such as frustration, confusion, or technical difficulties, occur less frequently and are more sparsely distributed. Frustration is commonly associated with the creative process or with difficulties in attaining the intended outcome, whereas confusion and technical issues are associated with specific moments in the use of the tool or with the interpretation of the challenges.

A relevant aspect that emerges from the analysis of this first challenge is the coexistence of positive and negative indicators within the same image. The table indicates that the visual productions do not operate according to a dichotomous logic but instead simultaneously incorporate opposing evaluations. This overlap points to the image functioning as a space of experiential synthesis, through which students articulate the complexity of the formative process without reducing it to a unidimensional interpretation.

In the second challenge (53 images and prompts collected), the structure of the indicators shows a substantially different configuration. Positive indicators clearly prevail, and within the resulting percentage (92.45%), they are mainly concentrated on theoretical learning, which emerges as the central axis of most prompts and images analyzed. References to GenAI-related learning are also notable, although secondary to theoretical content, which reinforces the idea that GenAI is perceived as an instrumental tool for facilitating visual learning.

Indicators related to creative learning maintain a less prominent presence and are functionally integrated into the representation of knowledge, largely subordinated to the conceptual clarity of the prompts and visual outputs. In contrast, collaborative learning appears only marginally, suggesting that this dimension loses prominence when students reflect on the knowledge acquired from a more individualized perspective.

In terms of negative indicators in this second task, the table reveals a very limited occurrence, confined solely to references to stress associated with learning. The absence of other negative indicators, such as technical frustration or conceptual confusion, suggests a focus on learning outcomes rather than on difficulties encountered during the process. This shift underscores the functional difference between the two tasks and highlights students' ability to modulate the content of their prompts and visual productions in line with the evaluative objective.

While the evaluation of PB results in complex, hybrid, and relational images featuring multiple coexisting indicators, the projection of knowledge demonstrates a greater degree of thematic focus and a marked orientation toward theoretical content. These results reinforce the role of prompts and images as a versatile evaluative resource, capable of conveying both reflective processes and demonstrations of learning in image theory within the context of higher education.

4.3. Analysis of Student Voting

In general, voting results show a predominant tendency to select images that fully meet the objectives of each challenge (Table 8), suggesting a shared understanding of theoretical foundations related to image theory applied in PB.

Focusing on the modality dedicated to types of prompt modifiers, the votes reflect a differentiation across the various challenges. Some of them show greater consensus around full achievement of the objective, while others exhibit more dispersion toward basic fulfillment. This variability indicates that not all prompt modifiers involve the same level of conceptual complexity or require the same degree of interpretative precision from the evaluating students, especially when the challenges rely on abstract theoretical concepts.

Table 8. Student Voting in the PB

Modality (M)	Challenge (C)	Number of votes	Conceptual error	Basic objective fulfillment	Full objective fulfillment
M1. Prompt modifiers	C1	57	0%	63.15%	36.84%
	C2	56	1.78%	23.21%	75%
	C3	57	0%	77.19%	22.8%
M2. Creation	C1	56	3.57%	0%	96.42%
	C2	55	32.72%	5.45%	61.81%
	C3	57	26.31%	22.8%	50.87%
M3. Intermediality	C1	57	0%	15.78%	84.21%
	C2	56	7.14%	5.35%	87.5%
	C3	57	8.77%	10.52%	80.70%
M4. Reproduction	C1	50	0%	4%	96%
	C2	51	9.8%	5.88%	84.31%
	C3	51	17.64%	21.56%	60.78%
M5. Collaborative	C1	51	21.56%	41.17%	37.25%
M6. Alternative gazes	C1	50	4%	56%	40%
	C2	50	22%	0%	78%
	C3	50	28%	26%	46%
M7. Sequential image	C1	51	0%	11.76%	88.23%

Source: own elaboration, 2026.

The creation modality shows a more heterogeneous pattern in the voting behavior. While students clearly identify images that fully meet the objectives set in the first challenge, a greater presence of votes associated with partial fulfillment or even conceptual errors is observed in the two remaining challenges. This dispersion is related to the complexity of the challenges, which combines multiple principles of image theory and requires precise visual articulation of multiple levels of meaning. In this context, students' votes reflect not only the inherent difficulty of the challenges but also the range of possible interpretations.

In the intermediality modality, the votes exhibit greater consistency. Images that demonstrate full attainment of the objectives are predominant, especially in challenges where the interplay between media is explicit and readily identifiable. Nevertheless, in the second and third challenges, a small proportion of votes falls into the categories of basic fulfillment and conceptual error, highlighting the need to reinforce students' understanding of media hybridization and intermedial references.

The reproduction condition is characterized by a high concentration of votes for images that achieve either full or basic attainment of the objective. Challenges related to clearly identifiable formal principles, such as symmetry, rhythm, or visual weight, facilitate the application of shared evaluation criteria and reduce the incidence of conceptual errors. Conversely, the use of line types—which requires a more abstract analysis—is linked to a substantial proportion of conceptual errors. Overall, however, this pattern indicates that challenges involving the analysis and reproduction of visual structures elicit higher levels of agreement among evaluators.

In the collaborative modality, the voting pattern exhibit a wider distribution across the three analytical categories. Evaluating images produced through iterative, collaborative processes adds an extra dimension of complexity, requiring students to consider not only the final outcome but also the internal consistency of an image modified through successive iterations. This situation results in a more balanced distribution across conceptual errors as well as basic and full levels of achievement.

Conversely, the alternative gazes and sequential image modalities display distinct behavioral patterns. In the first, the experimental nature of the challenges generates greater diversity of interpretations and a more noticeable presence of conceptual errors in some cases. In the second, the proposed narrative structure enables a clearer and more consensual evaluation, with votes predominantly concentrated on images that demonstrate full attainment of the objectives.

4.4. Evaluation of the Student Experience

The data obtained from the survey show that, in general, students started with limited knowledge of GenAI and infrequent use of it in their daily practice (Table 9). The majority of responses are situated at low to intermediate levels in terms of both knowledge and usage, suggesting that familiarity with this type of technology had not been fully consolidated at the beginning of the experience. This baseline is relevant for understanding the educational scope of PB, as it situates the activity within a context of introduction and initial literacy in the use of GenAI applied to image creation.

Table 9. Student Knowledge and Use of GenAI before the PB

Item	None	Very low	Low	Medium	High	Very high
Rate your level of knowledge about GenAI before participating in the PB	1.7%	10.2%	39%	42.4%	6.8%	0%
Rate your level of use of text-to-image GenAI in daily life before participating in the PB	25.4%	28.8%	13.6%	28.8%	3.4%	0%

Source: own elaboration, 2026.

In Table 10, which corresponds to the post-experience evaluation, a significant reconfiguration of students' perceptions regarding various aspects of learning is shown. The responses indicate a high degree of agreement that PB has contributed to consolidating their understanding of image theory, as well as improving creative skills and abilities related to image generation through GenAI. Similarly, the results indicate a positive impact of PB on students' understanding of how text-to-image GenAI functions, suggesting a progressive appropriation of basic prompting principles and the operational logic of these tools.

Table 10. Student Experience in the PB

Item	Strongly disagree	Disagree	Agree	Strongly agree
The PB has strengthened your knowledge and understanding of image theory.	5.1%	5.1%	88.1%	1.7%
The PB improved your creativity and skills related to creating images.	5.1%	10.2%	57.6%	27.1%
The PB has improved your knowledge and skills related to the functioning of text-to-image GenAI for image generation.	5.1%	6.8%	64.4%	23.7%
The PB promoted coordination and teamwork.	5.1%	11.9%	54.2%	28.8%
I would have preferred to work on the theoretical part of the course using other types of practical activities instead of carrying out a PB.	20.3%	55.9 %	16.9%	6.8%
Overall, I am satisfied with the PB.	5.1 %	8.5 %	64.4%	22%

Source: own elaboration, 2026.

Additionally, the data reveal a positive perception of teamwork and group coordination fostered by the PB dynamic, consistent with its methodological framework grounded in collaborative learning. In contrast, responses regarding the preference for other practical activities over the PB are predominantly in disagreement, indicating that the experience is not regarded as an inadequate replacement for alternative instructional strategies.

A comparison of the two data sets reveals a clear distinction between students' initial baseline and their post-experience performance. This distinction underscores the value of the

PB as a methodological approach for introducing, cultivating, and consolidating competencies related to both image theory and the critical and applied use of GenAI in the context of higher education.

4.2. Limitations of GenAI in the Context of the PB

Regarding semantic comprehension, the results indicate that GenAI is capable effectively of translating a substantial portion of the theoretical concepts presented, provided they are formulated clearly and in a structured manner (Table 11). However, when prompts contain abstract, relational, or metaphorical concepts without clear descriptive anchors, the resulting visual outputs tend to be less precise, reflecting a direct dependence on the linguistic quality of the prompt and a lack of deep conceptual understanding by the GenAI system.

Table 11. Limitations of the GenAI System in the PB

	Poor	Needs improvement	Acceptable	Very good	Excellent
Semantic understanding	0.37%	9.25%	10.19%	19.35%	60.84%
Technical limitations	0%	2.34%	7.29%	16.07%	74.30%
Interpretative limits due to saturation	0.09%	8.50%	14.49%	19.44%	57.48%
Visual consistency of sequential images (M5)	0%	35%	18.33%	20%	26.66%

Source: own elaboration, 2026.

Technical limitations become particularly apparent in images exhibiting a high degree of compositional complexity. While formal coherence is generally maintained in simple or moderately complex configurations, morphological and spatial inconsistencies emerge when prompts demand the concurrent integration of multiple visual elements. This pattern underscores the constraints of the GenAI system in sustaining a coherent internal visual logic in densely composed images.

In turn, the interpretative limits caused by saturation indicate that the accumulation of instructions and constraints within a single prompt generates an implicit hierarchy of information, whereby the system prioritizes certain elements while neglecting others. This tendency highlights the importance of implementing selective and systematically structured prompting strategies within educational contexts.

Similarly, examining visual consistency in sequential images reveals challenges in preserving both formal and narrative coherence across images produced from a mutating prompt. The variations observed in aesthetics and spatial arrangement of elements underscore a notable limitation of GenAI in tasks demanding visual continuity.

5. Conclusions

The findings highlight the potential of the PB as an innovative methodological strategy for fostering the comprehension, practical application, and consolidation of core concepts in image theory within the context of higher education. Moreover, the findings indicate that the approach employed in utilizing GenAI creates new opportunities to integrate theory, practice, and creativity with GenAI literacy. The data further underscore the value of this pedagogical approach, not only in reinforcing student learning but also in identifying and addressing potential gaps in their educational process.

With respect to the PB's design, it plays a crucial role in establishing a complex evaluation system that leverages the dynamics inherent to the competition. The established rules, modalities, and challenges provide a strong foundation for implementing the PB in teaching image theory, while simultaneously accommodating future innovations that expand the approach and deepen learning through new perspectives. Nevertheless, the time allocated to each challenge emerges as a critical factor, given that students' limited prior knowledge and

experience with GenAI can constrain the fluency and scope of iterative processes. In this context, three directions for enhancing future PB designs are suggested: first, evaluating students' GenAI competence in advance to better tailor challenge durations; second, experimenting with varying time limits based on the complexity of each challenge; and third, integrating mechanisms into the PB design to examine complete sequences of iterative processes and their interplay with temporal constraints.

Turning to the evaluation, the findings underscore the validity of the triadic system, which integrates the analysis of prompts and their generated images, the evaluative prompts and images, and student voting. The first method enables a precise assessment of the acquisition of image theory fundamentals and, as well as their connection to prompt formulation, originality, and ethical responsibility in image creation. This approach could be further developed in future PBs by correlating the learning of a specific subject with the assessment of students' prompting skills or by analyzing the impact of PB on student creativity, taking into account the levels proposed by Gil-Ruiz and Domínguez-Lloria (2025).

The second method, which is non-competitive, establishes an evaluation framework that regards prompts and images as vehicles for expression and creation, channeling and reflecting the emotions, knowledge, opinions, and creativity arising from the competitive experience. The considerable informational potential they embody underscores the need to further explore this approach and refine this evaluative mechanism, whether by analyzing students' iterative processes, implementing group assessments through mutating prompts, or examining the influence of temporal frameworks on its quality.

The third method, which relies on voting, enables a thorough evaluation of students' conceptual judgment frameworks and offers a precise insight into their mastery of image theory through a process of critical analysis. As a limitation, the large volume of images submitted for voting may have impacted students' analytical capabilities, highlighting the need to investigate alternative configurations in terms of PB duration, participant engagement, and extent.

From another perspective, students report improvements in theoretical comprehension, creativity, AI literacy, and collaborative skills, positioning the PB as a highly valued pedagogical strategy aligned with the demands of contemporary visual literacy mediated by emerging technologies such as GenAI.

In relation to the limitations of the GenAI system used, while it performs effectively in generating images from well-structured prompts, the system demonstrates specific challenges: namely, interpreting abstract concepts or extended prompts, and preserving visual consistency across sequential images. In this regard, further studies could explore these limitations in greater depth by conducting a comparative analysis of various GenAI systems employed in the PB within higher education, with the aim of identifying the most suitable tools for its implementation.

In conclusion, the PB constitutes a practical and enabling pedagogical approach, in which the acquisition and consolidation of knowledge related to image theory unfold and are articulated simultaneously with the development of key competencies associated with both prompt literacy and GenAI literacy. Furthermore, it is a flexible strategy that could be transferable and scalable not only to other audiovisual communication courses but also to other fields of knowledge.

6. Acknowledgements

This work was developed within the framework of the project "Prompt Battle: Use and Learning of Generative AI in the Bachelor's Degree in Audiovisual Communication," approved as part of the Fourth Internal Teaching Plan at the University of Seville.

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