From Concept to Production: The Integration of Artificial Intelligence in the Pre-Production of Animated Films

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Abstract:

This article examines the potential integration of artificial intelligence tools into the filmmaking process, with a focus on the Pre-Production stage, which includes the design, development, and preparation of production, especially for animated films.

Through interviews with experts, literature review, open-source tool testing, and participation in real film projects, the study examines the creative and technical roles that AI can assume during Pre-Production. The research analyzes how AI technologies influence early production workflows and evaluates their broader impact on the production pipeline through comparative assessments and real-world applications. Adopting a dual methodological approach that combines a systematic literature review with an applied experimental study, the article moves from a conceptual examination of AI's capabilities to a collaborative, practice-based experimental investigation.The first experiment provides a comprehensive review of available AI tools, while the second presents a practical experiment in which students and industry professionals collaborated to create short films using AI-driven production methods.

The study aims to highlight the possibilities, limitations, and challenges arising from AI integration in the pre-production of animated films, contributing to the discussion on the evolution of the film industry and the use of modern technologies in the creative process.

Key words:

Artificial Intelligence (AI), Pre-Production, Animated Films, Filmmaking Process, AI Character Design, Tool Integration, Production Workflow, Human-AI Collaboration.

1. Introduction

1.1 Background

The integration of artificial intelligence (AI) tools into the pre-production phase of filmmaking represents a dynamic field with significant potential as well as notable challenges. It is a timely and pressing issue within the cinematic domain, raising concerns about whether this direction is a viable and appropriate choice. This study

aims to examine the ways in which AI can enhance production processes by improving efficiency, expanding creative possibilities, and offering new methodologies for conceptualizing and developing films.

The present research focuses on exploring how AI can contribute specifically to the pre-production of animated films. It investigates both the opportunities and the limitations arising from the use of such tools, through the testing and evaluation of open-source software applied to various pre-production tasks. These include scriptwriting, dialogue generation, character and environment design, music and sound effect selection, and storyboard creation. While the study considers various aspects of AI integration in pre-production, particular attention in this article is given to character design as a central area of exploration.

1.2 Aim of the Study

The primary aim of this research is to address critical questions regarding the integration of artificial intelligence (AI) tools in the pre-production phase and their impact on the overall production pipeline. It seeks to examine whether AI constitutes a useful tool, whether it replaces human labor, whether it diminishes or enhances creativity, and in what ways it may support the creative pre-production process. The study also investigates the limitations and challenges associated with the adoption of AI in the industry, its potential to assist emerging artists, its current impact, and its possible future implications. Through systematic analysis and experimental application of these tools, the research aims to provide meaningful proposals for the use of AI in the film industry and to contribute to its ongoing development.

Furthermore, the research explores the potential of AI as a supportive instrument in the creative process, without focusing on the replacement of human input. However, this particular article concentrates on character design, examining how it both influences and is influenced by the broader production workflow.

1.3 Overview of Methodology

The research began with a literature review and expert interviews to establish a foundational understanding of artificial intelligence in contemporary filmmaking. This theoretical phase identified the benefits, challenges, and limitations of AI tools, forming the basis for a set of evaluation criteria used to compare multiple tools across different stages of pre-productio; revealing both their potential contributions and the most effective options for each stage.

The applied phase involved a structured evaluation in which 22 students created pre-production materials using both traditional and AI-assisted methods. Their work, covering character design, storyboarding, music development, and the full pre-production pipeline of an animated short film, was assessed through a blind review by five industry experts. This process validated the theoretical findings and examined whether AI improves speed, efficiency, collaboration, and the professional quality of emerging creators' work. Experts also evaluated whether AI-generated outputs are distinguishable from traditional ones and whether AI influences artistic identity.

To further test the tools in real production conditions, AI was applied during the pre-production of two animated short films. This provided additional insights into usability, professional suitability, and effectiveness in tasks such as storyboarding.

Overall, the study combines theory, controlled experimentation, and real-world application to offer a comprehensive assessment of AI's role and potential in the pre-production process.(figure 1)

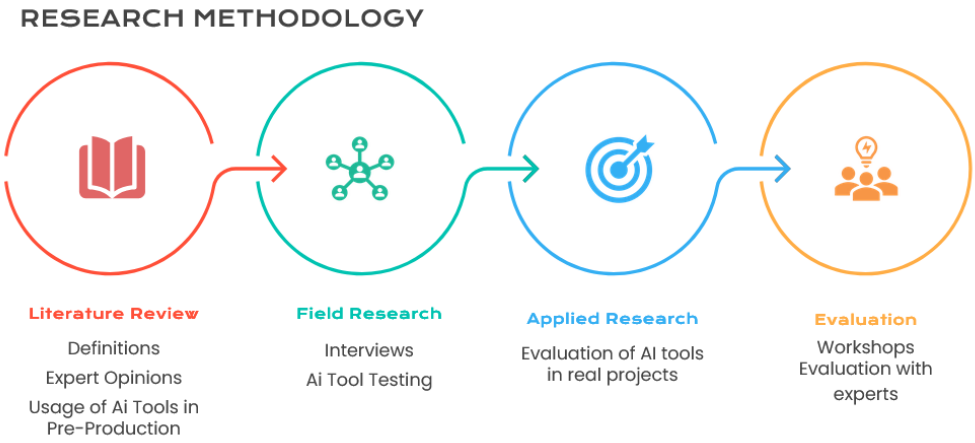

Figure 1 *Visual Representation of Methodology*

2. Literature Review

2.1 Desktop research

To understand the role of artificial intelligence (AI) in contemporary film production, a structured literature review was conducted. This review examines key theories, definitions, and case studies that trace the evolution, current uses, and future potential of AI in the film industry, with emphasis on the pre-production phase. Its purpose was to situate the study within existing research, identify knowledge gaps, and inform the development of hypotheses later tested through empirical work.

The first section defines AI and its cinematic applications, highlighting technologies such as generative AI and Generative Adversarial Networks (GANs), which enable machines to produce realistic digital content (Amato et al., 2019). Historical milestones, including Benjamin AI, the first autonomous scriptwriting system (Momot, 2022), and the film Frost, demonstrate how AI challenges assumptions about emotional expression in machine-generated imagery (Danesi, 2024; Spair, 2024; Zhu & Zhang, 2022).

The second section reviews scholarly perspectives on AI in pre-production. Researchers present both optimistic and critical viewpoints: some emphasize efficiency, automation, and new creative possibilities (Parikh, 2019), while others raise concerns about originality, authorship, and aesthetic uniformity (Chow, 2020). These perspectives illustrate how technological innovation reshapes traditional filmmaking practices and introduces new creative methodologies.

Character design emerges as a particularly active area of AI application (Spair, 2024). Studies show that AI tools are increasingly used to generate environments, concept art, and character prototypes, enabling rapid visual experimentation. Audience acceptance is growing, especially when AI successfully replicates established artistic styles (Parikh, 2019; Swarnakar, 2024).

However, the literature also identifies limitations, including aesthetic homogenization, reduced originality, and reliance on existing datasets (Corrêa, 2023; Li, 2022). Most scholars agree that human creativity—intent, cultural understanding, and emotional depth—remains essential (Monod & Jiang, 2023; Shahi & Sinha, 2021). Thus, AI is best viewed as a collaborative tool rather than a replacement for human authorship (Momot, 2022; Sun, 2024).

Overall, the literature suggests that AI has a largely positive impact on pre-production, particularly in character creation. These insights informed the study's hypotheses regarding the creative, aesthetic, and practical effects of AI tools, which were later tested through tool-based experiments and evaluation sessions described in the methodological section.

2.2 Experts' opinions

This section aims to address a central question: *What do industry experts think about the use of artificial intelligence (AI) tools in the filmmaking sector?* Do they believe AI will enhance the field or diminish its quality? These questions were examined through a combination of literature review, drawing from online books and academic articles in which authors express their views and interviews with contemporary professionals, allowing a comparison between theoretical insights and current industry perspectives.

The interviews were conducted with the objective of understanding how experts and educators perceive the potential benefits of AI, the challenges it still presents, and the degree of acceptance it currently holds within the field. These insights were compared and synthesised with the findings of the desktop research to form a more complete picture of AI's present role as a tool, as well as its near-future trajectory according to professional experience.

The interview questions focused on a range of topics, including the advantages of AI-based tools, opinions regarding their introduction into film production workflows, recommended methodologies for their use, and observations drawn from professional practice. Participants were also asked whether they consider AI a potential risk for human creators, what they believe constitutes an appropriate and ethical use of such tools, and which ethical dilemmas may arise from their adoption.

The purpose of this evaluation was to identify the strengths and weaknesses of AI in comparison with traditional methods. Specifically, it sought to determine whether the initial assumptions about the positive characteristics of AI tools were accurate or biased, whether AI genuinely facilitates and accelerates the creative process, and whether it enables individuals with limited experience to produce work that approaches professional quality.

2.2.1 Theoretical Framework: Expert Perspectives in Literature

Expert perspectives on the evolution of artificial intelligence in creative production reveal a complex and often contradictory landscape. Theoretical insights drawn from the literature emphasize that, although AI can significantly enhance efficiency, particularly by automating repetitive tasks, it cannot replicate the emotional depth, narrative intuition, or imaginative capacity inherent to human creativity. Artistic identity remains fundamentally rooted in human experience, and cinema, as a medium

of emotional and cultural expression, continues to rely on conscious human intention and interpretation (Momot, 2022; Tang & Chen, 2024; Parikh, 2019).

2.2.2 Expert Interviews: Qualitative Analysis

Complementing these theoretical perspectives, the interviews with six professionals (including scriptwriters, directors, audiovisual specialists, and a university professor) highlight AI's role as a creative enabler rather than a replacement. Experts described AI as a dynamic and experimental tool that can inspire novel outcomes, sometimes precisely because of its unpredictability. They emphasized that the effectiveness of AI depends on the creator's active involvement, clarity of artistic vision, and ability to adapt the tool to the specific needs of each project. While concerns remain regarding its limitations, most experts agreed that AI will increasingly become an integral part of the production process, particularly in pre-production tasks such as character design, storyboarding, and script development.

2.2.3 Comparison of Perspectives and Conclusions

Ultimately, the future of AI in the creative industries will be shaped not only by its technical capabilities but also by the ways in which society chooses to engage with it. Whether AI becomes a collaborative partner or a disruptive force depends on the ethical, artistic, and cultural decisions made by creators, institutions, and audiences. As one expert noted, *"AI is a tool; it does not replace expertise, but it can amplify it when used with intention."*

Experts also discussed the stages of production in which AI is most beneficial, whether they would personally adopt AI tools and why, and which methodologies they consider most effective. These insights helped determine whether the conclusions drawn from the literature review align with the perspectives of active professionals, and they informed the approach used in the subsequent evaluation of AI tools specifically, which tools were worth testing and how they should be assessed.

3. Methodology

3.1 AI Tool Testing

A series of open-source and free artificial intelligence tools were tested to evaluate their applicability within professional filmmaking workflows. The areas of application included screenwriting, dialogue generation, character and costume design, digital background creation, music composition, sound design, storyboarding, and video production. The aim was not only to confirm the findings of the literature review, particularly in the areas where AI was reported to be beneficial, but also to gain first-hand experience with the practical use of AI throughout the process. The tools were compared against one another using predefined evaluation criteria, allowing conclusions to be drawn regarding which tools were most effective and how they supported each stage of production in comparison with traditional methods.

3.1.1 Procedures

The testing process began with the identification of suitable tools for each individual task. The selection focused on the most widely recommended open-source options, with

the primary objective of assessing whether they could improve the workflow in terms of quality, time efficiency, creativity, and ease of use. An additional goal was to determine whether these tools could compete with traditional methods, as suggested by the findings of the previous chapters.

In screenwriting, tools such as Texta AI (Texta.ai, 2021) were used to support idea generation, structural organization, and narrative development. For visual tasks, functionalities such as sketch-to-image conversion, cinematic prompt enhancement, image blending, and smooth element removal were examined. Additional testing involved 3D modeling tools for character creation, voice generation systems for dialogue delivery, and audio synthesis platforms for producing original music and sound effects

3.1.2 Evaluation Criteria and Analytical Framework

Evaluation was based on three primary criteria: user experience, content quality, and limitations. User experience was assessed in terms of tool usability, interaction flow, and time efficiency. Content quality was evaluated based on completeness, aesthetic coherence, and creative potential. Limitations included technical constraints, output accuracy, and ethical considerations. The analysis focused on how these tools integrate with existing production practices and the extent to which they expand creative possibilities. Particular attention was given to accessibility, with emphasis on the potential of these technologies to support a wide range of creators across different levels of expertise and resources.

3.1.3 Screenwriting

Character design in filmmaking begins with the screenplay. Using AI tools such as Texta AI, script creation becomes a streamlined and accessible process, even for users without prior experience. The system guides users through genre, target audience, duration, characters, and setting, generating thematic options and producing a complete script with character descriptions, dialogue, scene structure, and automatic name generation. Users can request modifications, including shortening the story, changing tone, or replacing scenes. The tool also supports episodic formats and operates exclusively in English, though translation tools like Copilot enhance accessibility.

3.1.4 3D Generation

For 3D character creation, Anything World (Anything World, 2018) was tested. It allows models to be generated from either descriptive text or images. AI-generated images produced the most realistic results (figure 2), while hand-drawn sketches lacked depth. Digital designs performed better overall, and the models could be used immediately in other platforms. Characters can be animated with preset motions, with more options expected to be added.

***Figure** 2 Examples of 3D character creation: reference images on the left, generated results on the right*

3.1.5 Image Generation

Three image-generation tools, Leonardo AI (2022), Magic Studio (2023) and Freepik (2010) were evaluated for visualizing characters and costumes. Leonardo AI excels in lighting and pose rendering, Freepik in accurate facial features, and Magic Studio in artistic costume design. Combining these tools yields optimal results, as each offers distinct advantages depending on project needs.

All tested AI systems demonstrated strong interpretive capabilities, even when user input contained minor errors. Their intuitive design allows image creation without specialized knowledge, making them accessible to users with varying levels of experience. These tools supported background creation and storyboarding, where AI-generated visuals helped organize scenes and inspire final designs. They also enabled effective visual concept representation, allowing abstract ideas to be translated into coherent imagery. Furthermore, the platforms facilitated exploration of new styles, encouraging experimentation with aesthetics and character traits (like the colour Palette) (figure 3). In one example, merging features from multiple tools resulted in a distinctive fairy character (figure 4), illustrating how AI fosters creative innovation and stylistic diversity.

***Figure 3** Creative character visualization, designed with inspiration drawn from the left-hand image, utilizing a selected color palette derived from the AI-generated visuals on the left.*

Figure 4 *Results from the three systems using a similar prompt, in the order: Leonardo AI, Magic Studio, and Freepik.*

3.1.6 Conclusions

Through this research, several findings from the literature regarding the use of AI tools were confirmed, while new insights also emerged, particularly concerning the enhancement of creativity and the methodologies through which these tools can be applied to specific tasks. These aspects were evaluated through the practical assessments, where the tools identified as most effective for each task were the ones selected and used by the students during the implementation phase.

3.2 Evaluation

The evaluation process was structured in two distinct phases: the first involving student participants, and the second engaging expert reviewers.

3.2.1 First Phase

The first phase of the evaluation took place in a Computer Lab during a 90-minute session and involved 22 students divided into four groups with varying levels of experience in screenwriting and AI tools. Participants differed in their familiarity with AI, some had limited exposure, mainly for ideation or basic image generation, while others had no prior interaction with such technologies. Screenwriting experience also varied, ranging from students with some practice to complete beginners. Group composition was mixed, with certain teams formed by individuals who had collaborated before and others consisting of students with no previous working relationship. Notably, most groups using AI had minimal prior experience with these tools, and when experience existed, it was typically limited to script-editing applications. Overall, filmmaking experience across participants was generally low, providing a diverse yet inexperienced sample for evaluating AI-assisted and traditional workflows.

3.2.1.1 Work Execution Process

Before the activity, participants reflected on their filmmaking background and familiarity with artificial intelligence. During the session, each group created a short project on the theme *"unexpected friendships,"* working across scriptwriting, character

development, dialogue, background design, and music selection. One group used AI tools, while the others followed traditional methods.

Each group completed the same tasks independently: writing a script, describing and designing at least two characters, creating dialogue, producing one background, and selecting or creating suitable music. Participants could use any medium, but only the AI-assigned group was permitted to use AI tools.

The tools used included udio.com (2024), MagicStudio AI Art Generator, Texta.ai Script Generator, Freepik AI Image Generator, and Gening.ai. . Final outputs were presented digitally or physically, followed by structured feedback. This process enabled a direct comparison between AI-assisted and traditional creative workflows, focusing on creativity, organization, and production efficiency.

3.2.1.2 Evaluation criteria

The evaluation focused on task completion speed, changes made during the creative process, usability challenges, group strategies (with or without AI), and the overall influence of AI tools on the creative outcomes. The purpose of this assessment was to verify theoretical claims identified in earlier stages of the research—specifically, whether AI tools accelerate and simplify the workflow, whether they preserve artistic identity, whether they enhance content quality even for inexperienced users, and whether they ultimately support creative development.

The methodology adopted by the students closely resembled the workflow patterns identified during the tool-testing phase, with minor variations. To assess the effectiveness of these methodologies, the sequence and manner in which tools were used were documented, along with the order in which both AI and non-AI groups approached their tasks. This allowed for an examination of whether AI tools implicitly guide users toward a particular workflow structure.

3.2.1.3 Results

Participant observations revealed a strong link between character design, script development, and background creation. Many began with a clear idea of the character, using AI-generated descriptions to guide visual design and then adapting the background to match the chosen artistic style. Music choices reflected the overall tone shaped by earlier decisions. This workflow suggests that participants first visualized the core style through character design and subsequently adapted the remaining components to maintain consistency.

Groups using AI tools worked faster and more collaboratively, with shared screens enhancing coordination. Script descriptions helped even inexperienced users contribute to character design. Despite some image inaccuracies, teams refined outputs using keywords and adjustments. In contrast, traditional-method groups worked more independently, facing challenges in maintaining stylistic consistency and integrating characters into scenes. The AI tools provided a common visual framework that enhanced collaboration, though automated image generation required creative adjustments to meet expectations. Participants acknowledged the need for better

understanding of AI capabilities and limitations to fully leverage its potential in creative workflows.

The findings indicate that familiarity with AI tools influenced both the speed and structure of the creative workflow. Experienced users produced more organized scripts with well-defined characters, following a clear sequential methodology (script, dialogue, character design, background, and music) while non-AI teams worked more freely but struggled with coherence and stylistic consistency. AI-supported teams collaborated more effectively, using shared visual references and adapting outputs through iterative refinements. In contrast, non-AI teams worked more independently, facing challenges in coherence and visual consistency.

AI was seen as a valuable tool for guidance and inspiration, though human input remained essential for authenticity. Final outputs often reflected the creators' personalities, and in many cases, the origin of ideas was indistinguishable from human-generated content (figure 5), surprising even skeptics. While the quality of AI-generated material was generally satisfactory, concerns were raised about imaginative depth and source transparency. Ethical and professional considerations were identified as key factors in the responsible use of AI in creative practice.

Figure 5 *Characters from the workshop results. The first image is based on a script developed with the assistance of artificial intelligence, while the last two originate from scripts created without AI involvement.*

3.2.2 Second Phase: Expert Evaluations

3.2.2.1 Procedure

The second phase of the evaluation involved expert reviewers and employed a blind-review methodology. AI-assisted and traditionally created scripts from the first phase were mixed to eliminate bias. Five experts independently assessed the material using a structured questionnaire, focusing on plot quality, character coherence, costume design, dialogue authenticity, scene atmosphere, and music suitability. The aim was to evaluate the creative impact of AI and determine whether experts could reliably distinguish between human-generated and AI-enhanced content.The expert panel consisted of two experienced screenwriters, an AI-specialized audiovisual content expert, an electrical and computer engineer with AI and filmmaking experience, and an Assistant Professor in Film Informatics.

The expert evaluation was conducted to verify, from a professional perspective, whether the quality of AI-assisted outputs was comparable to traditionally produced work and whether the origin of each script could be identified as AI-generated or not. This phase also examined the claim that artificial intelligence lacks an authorial voice or creative identity—an assumption that proved inaccurate based on the experts' responses.

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Results revealed varied levels of recognition accuracy (figure 6). Two professional screenwriters, despite initial confidence, correctly identified AI-generated scripts only 30% of the time. Interestingly, the scripts they attributed to AI were actually human-made, suggesting that AI can produce structured and clear narratives that challenge assumptions about stylistic authenticity. In contrast, an AV specialist and a computer engineer achieved 70% accuracy, citing stylized language, excessive detail, and artificial dialogue as indicators. The highest accuracy (82%) was recorded by an assistant professor, who attributed his success to the systematic structure typical of AI-generated scripts. Familiarity with AI tools appeared to enhance recognition ability, though human input remained essential for emotional depth and narrative nuance.

Overall, the evaluation highlighted AI's strengths in improving script organization, character development, and production efficiency. However, traditional methods continued to excel in areas requiring direct artistic interpretation, such as costume design. AI-assisted scripts often retained the creator's personal touch, demonstrating that technology can enhance rather than replace human creativity. Experts agreed that AI functions best as a supportive tool, with human storytelling remaining central to the authenticity and emotional resonance of cinematic work.

This phase also confirmed the competitive potential of AI compared to traditional methods and challenged several common assumptions, such as the belief that AI lacks an authorial voice, that its outputs are easily identifiable, or that the quality of AI-generated material is inherently inferior or creatively limited. On the contrary, the findings showed that AI can effectively support the creative process, helping less experienced creators organize their ideas and produce work that appears more polished and professionally structured.

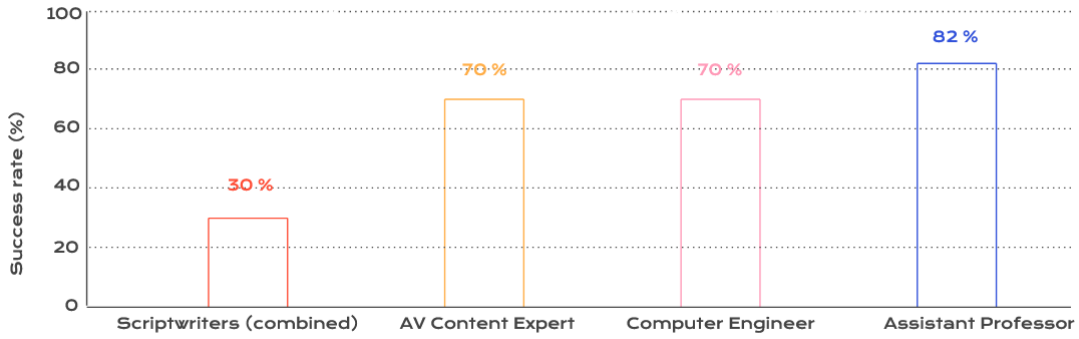

Figure 6 *Chart illustrating the success rates of five experts in correctly identifying AI-assisted scenarios, highlighting their individual performance across evaluated cases.*

3.3 Applied Research

Following the previous stages of the research, I sought to test the conclusions within the context of a real production project, using realistic timelines, production constraints, and professionally written scripts. This phase placed the selected AI tools under practical conditions, allowing their performance to be evaluated using concrete, production-ready material. For this project, I was provided with two scripts and tasked with developing the characters, music, and storyboard with the support of AI-assisted tools.

This section outlines how the tools and findings from earlier chapters informed the development of character designs, storyboard sequences, and musical elements for these scripts. The methodology is presented in two parts: first, the workflow applied to character creation, and second, the workflow used for storyboard development. In addition to testing the AI tools that performed most effectively during the initial evaluation, I applied specific creative methodologies that I consider essential for achieving professional-level results without compromising the artist's personal identity.

The section concludes with two step-by-step storyboard approaches. In the first, the final outcome consists entirely of hand-drawn sketches, while in the second, AI-generated imagery is combined with manually drawn elements to form a hybrid workflow.

Building on the preceding analysis, this phase examines the use of contemporary AI tools for character visualization, music composition, and storyboard creation within a structured production environment. Working with two professionally written scripts centered on the theme of "unexpected friendships," the objective was to assess the functionality and effectiveness of AI under real-world production constraints. The investigation focuses on how AI can support the creative workflow, enhance artistic output, and improve efficiency by reducing the time and effort required by traditional methods, with particular emphasis on the character creation process.

3.3.1 Character Visualization Workflow

The character visualization process began with a close reading of the script descriptions to ensure clarity and coherence. These descriptions were then adapted based on the overall narrative context and personal aesthetic interpretation, while remaining compatible with the language understood by the AI system. For example, a simple description such as “a 25-year-old man in athletic clothing and a jacket” was expanded into a detailed prompt including visual style, mood, setting, and key attributes, such as the presence of strings on the jacket, which held narrative significance. This enrichment ensured that the AI-generated images aligned with the story’s thematic and emotional tone.

Following image generation, various styles (illustrated, realistic, comic etc.) were tested to refine the visual output. Satisfactory results were saved, focusing on clothing, facial features, and overall style. Six core images were selected to serve as visual references for the final character design. The final version was manually sketched using digital tools, integrating elements from the AI-generated outputs with original creative input to produce a polished and contextually appropriate character. (figure 7)

***Figure** 7 Character visualization from the first script: Left, AI images that served as a source of inspiration. Right, my final designs.*

3.3.2 Storyboard Visualization Workflow

The storyboard creation followed a similar hybrid approach. Initial drafts were generated using AI-based storyboard tools, with inputs including the script, main characters, and desired visual style. After evaluating and saving the results, a second phase involved manually illustrating scenes inspired by the AI-generated visuals. Descriptions from the storyboard were repurposed to produce new reference images, which informed the final sketches. This iterative process (combining AI assistance with manual refinement) enabled the development of original, cohesive visual narratives aligned with the project’s thematic goals.

3.3.3 Expert Review of the Results

The generated content was reviewed by both the design team and the original screenwriters to ensure alignment with the initial creative vision. The final character visualizations were unanimously approved, as they accurately reflected the narrative descriptions and exceeded expectations in terms of fidelity and artistic quality. Similarly, the storyboard received highly positive feedback, with reviewers acknowledging the creator's personal involvement and the effective collaboration with AI tools. The AI contributed meaningful suggestions based on the creator's aesthetic and conceptual input, serving as a source of inspiration and structural guidance.

In the second scenario, a minor revision was requested to avoid anthropomorphic elements that conflicted with the script's intent. This led to the development of alternative concept art, which was integrated into the background for evaluation. Although visibility issues emerged, they prompted a productive brainstorming session, during which new ideas were generated using AI image generated tools. These visuals informed the team's final direction, and a rapid sketch was produced to secure the concept and guide further development of the project.

3.3.4 Conclusions

The integration of AI tools in the creative workflow significantly accelerated production while maintaining high standards of quality and precision. Tasks that would typically require several weeks were completed within one, demonstrating AI's capacity to streamline complex processes such as character design and storyboarding. AI-generated visuals informed key decisions in lighting, composition, and character development, while human expertise ensured artistic coherence and emotional depth.

Expert evaluations confirmed the professional-level outcome, attributing success to the synergy between AI capabilities and strategic human input. This collaborative approach enhanced team communication, facilitated the transfer of complex ideas, and established an innovative framework for future creative applications. In both cases, the characters and storyboards were highly successful and required only minimal adjustments, indicating that the selected tools and the methodologies applied were effective in producing results that met professional standards.

4. Results

The findings of the research point to the development of a methodology that allows AI tools to support the creative process without diminishing the artist's personal identity. As AI becomes increasingly integrated into film production, it reshapes pre-production and design practices. This subsection presents a structured workflow for using AI during pre-production, inspired by traditional cinematic processes and validated through workshops and real project applications. The methodology clarifies how AI can enhance each stage of the workflow, what remains primarily human-driven, and how creators can achieve professional-quality results even without prior experience.

The proposed workflow includes tool selection, idea generation, script development, character and scene design, storyboard creation, team coordination, and music composition. Scripts are developed from original ideas or AI prompts and refined through iterative feedback. Character design begins with script-based descriptions, followed by AI-generated visual references that are manually refined. Backgrounds are created or enhanced with AI to maintain visual coherence. Storyboards combine AI suggestions with hand-drawn elements to ensure narrative clarity and cinematic atmosphere. Music is produced through targeted prompts and multiple iterations, as confirmed by expert evaluations and real-project testing.

Throughout the process, the balance between human and AI input shifts depending on the task: AI optimizes scriptwriting, while humans lead interpretation; character creation remains largely human-centered, with AI acting as a supportive reference. These dynamics align with insights from the literature and interviews, demonstrating that hybrid collaboration enhances creativity, efficiency, and artistic control.

Overall, AI offers an innovative approach that streamlines workflows and elevates creative output. Rather than replacing human creativity, it complements it—supporting production while preserving artistic vision and avoiding the pitfalls of emotionally detached, AI-driven content.

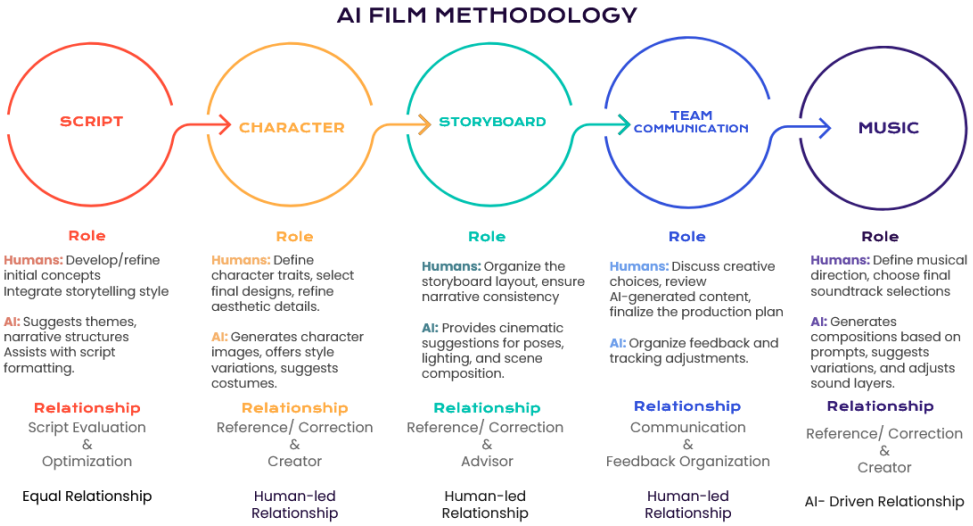

Figure 8 *Structured workflow visualization: Applying AI tools in pre-production*

5. Conclusion

Artificial intelligence is increasingly transforming the landscape of film production, offering a range of advantages that enhance creativity, accelerate workflows, and broaden access for emerging creators. Through tools that support pre-visualization, animatics, and iterative refinement, AI enables more efficient storytelling while fostering cross-disciplinary collaboration and experimentation. Personalized narratives and open-source platforms empower diverse voices, reducing entry barriers and

encouraging broader creative participation. Moreover, thoughtful UI design allows artists to tailor tools to their specific needs, while human-AI collaboration has shown promise in improving audience perceptions of artificial intelligence in creative contexts.

However, these benefits are accompanied by notable challenges and future concerns. AI-generated content often lacks originality or emotional depth, and over-reliance on algorithmic outputs can lead to formulaic storytelling. Misconceptions about AI's capabilities persist, while raw outputs typically require substantial human refinement. Ethical risks, such as bias reproduction and poor interface design, may limit effectiveness across artistic domains. To ensure responsible integration, creators must actively shape AI outputs, guided by transparency, ethical awareness, and critical thinking. The future of film lies in balancing innovation with authenticity, where human agency remains central. As AI continues to evolve, policymakers, creators, and audiences share the responsibility of shaping its cultural impact through informed, inclusive, and sustainable practices.

6. Future Work

Future research should aim to expand the scope of analysis to include live-action and television production, while deepening the qualitative assessment of artificial intelligence's influence on creative decision-making. A more refined comparison between human-generated and AI-assisted storytelling is essential to understand the evolving dynamics of authorship and narrative construction. Equally important is the need to educate both industry professionals and the general public on the capabilities and limitations of AI in media creation. Audience reception studies will offer valuable insights into how AI-generated content is perceived, and future work should incorporate a broader range of professionals (such as makeup artists) to assess AI's impact across all production domains. Additionally, critical issues such as sustainability, ethics, copyright, and energy consumption must be addressed to ensure responsible integration of AI technologies. Finally, the standardization of AI film categories is necessary to clarify what constitutes a film made with AI, thereby establishing a coherent framework for evaluation, classification, and discourse.

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