UDC 004.9:794.9:7.01

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GAME DESIGN OF CREATIVE ACTIVITY SIMULATORS: PRINCIPLES AND APPROACHES

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Анотація

У тезах досліджуються принципи та підходи до геймдизайну симуляторів творчої діяльності. Розглянуто основні концепції, що лежать в основі проєктування таких ігрових систем: механіки заохочення творчості, системи зворотного зв'язку, структури прогресії та дизайн ігрових середовищ. Проаналізовано існуючі підходи до балансування між свободою гравця та структурованістю ігрового процесу. Надано рекомендації щодо проєктування симуляторів з урахуванням психологічних аспектів творчої мотивації.

Ключові слова: геймдизайн, симулятор творчої діяльності, творча механіка, прогресія гравця, ігровий зворотний зв'язок, інтерактивне середовище, ігрова мотивація.

Abstract

This article explores the principles and approaches to developing simulation games for creative activities. It examines the key concepts underlying the design of such game systems: mechanisms for stimulating creativity, feedback systems, progression structures, and game environment design. Existing approaches to ensuring a balance between player freedom and a structured gameplay process are analyzed. Recommendations are provided for developing simulators that take into account the psychological aspects of creative motivation.

Keywords: game design, creative activity simulator, creative mechanics, player progression, game feedback, interactive environment, game motivation.

Introduction

The intersection of game design and creativity studies has produced a compelling class of interactive software – creative activity simulators. These are digital environments in which the primary gameplay loop centers not on defeating enemies or accumulating resources, but on the act of creation itself: composing music, designing buildings, painting virtual canvases, or crafting narratives. Such simulators have gained significant traction in recent years, driven by both consumer demand for expressive digital experiences and the growing recognition of games as educational and therapeutic tools [1].

Developing a creative activity simulator presents unique challenges that set it apart from traditional game design. The designer must create a system that is both open enough to allow for genuine creative expression and structured enough to provide players with meaningful goals, feedback, and a sense of progress. Without structure, players may feel lost; without openness, the experience ceases to be creative and becomes merely procedural [2].

The field of game design has developed a substantial body of theory – from Hunicke, LeBlanc, and Zubek's MDA framework to Zimmerman and Salen's rules-play-culture model – yet these frameworks were largely developed with competitive or narrative games in mind. Their direct application to creative simulators requires adaptation and extension [3].

This research paper aims to systematize the key principles and approaches specific to the game design of creative activity simulators. It examines the core design dimensions – mechanics, feedback, progression, and environment – and discusses how each must be configured to support and reward creative behavior in players of varying skill levels.

Defining the Design Space of Creative Simulators

A creative activity simulator can be distinguished from other game genres by three defining characteristics: (1) the primary output of gameplay is an artifact or performance created by the player; (2) the quality of this output is evaluated – either by the system, by other players, or by both; and (3) the player's agency over the

creative process is central to the experience [4]. This definition excludes games where creation is merely a secondary mechanic (e.g., Minecraft's survival mode) and focuses on systems where creation is the core loop. The design space of such simulators spans several domains: visual arts (drawing, painting, sculpture), music (composition, performance, sound design), narrative (story authoring, dialogue writing), spatial design (architecture, urban planning), and hybrid forms that combine multiple creative modalities. Each domain imposes specific constraints on the design of creative tools, evaluation systems, and progression mechanics [5].

Core Design Principles

Several foundational principles guide the effective design of creative simulators. These principles emerge from the intersection of game design theory, creativity research, and human-computer interaction. Table 1 presents a structured overview of the main design principles and their practical implications for simulator development.

Table 1 – Core design principles for creative activity simulators

Principle	Description	Design Implication
Creative Freedom	Players must have genuine agency over the creative output without excessive system constraints	Minimize forced patterns; provide open-ended tools
Scaffolded Learning	Gradual introduction of tools and complexity supports skill development	Design layered tool unlocking tied to progression
Meaningful Feedback	Evaluation must be timely, specific, and constructive rather than punitive	Implement multi-dimensional feedback systems
Intrinsic Motivation	Rewards should reinforce the joy of creation rather than replace it	Balance extrinsic rewards with creative exploration bonuses
Flow State Support	Difficulty should adapt to keep players in the optimal challenge zone	Use dynamic difficulty adjustment based on creative performance
Community Integration	Sharing and social feedback enrich the creative experience	Design galleries, critique systems, and collaborative modes

Creative Mechanics and Tool Design

The mechanics of a creative simulator are the interactive systems through which players construct their creative output. Unlike combat mechanics, which typically have binary outcomes (hit/miss), creative mechanics must support a continuous spectrum of quality and expression [6]. The design of these mechanics involves several key decisions: the granularity of creative control (e.g., note-by-note composition vs. chord-based selection in a music simulator), the abstractness of tools (realistic vs. stylized brushes in a painting simulator), and the reversibility of actions (unlimited undo vs. permanent decisions).

Research in creativity and tool design suggests that the best creative tools share three properties: they are learnable within a short time, they are expressive across a wide range of skill levels, and they reward mastery with qualitatively richer outputs [7]. In game design terms, these properties correspond to low entry barriers, high skill ceilings, and visible mastery progression – exactly the design triangle that the most successful creative simulators (such as GarageBand, Dreams, or Mario Maker) have achieved.

Feedback Systems and Evaluation Design

Feedback in creative simulators serves multiple functions: it informs the player of the quality of their work, guides their development, and sustains motivation. Unlike action games where feedback is immediate and unambiguous (the enemy falls), creative feedback must balance accuracy with encouragement [8]. Poorly designed feedback systems – those that penalize all deviation from a norm or that offer only vague praise – are among the most common causes of player disengagement in creative games.

An effective feedback architecture in a creative simulator typically comprises three layers: (1) real-time micro-feedback, which provides immediate sensory confirmation of each creative action (e.g., visual animation when a note is placed correctly); (2) session-level meso-feedback, which evaluates the creative artifact as a whole after completion; and (3) longitudinal macro-feedback, which tracks the player's creative growth across sessions and communicates progress toward long-term goals [9]. Each layer requires different algorithmic approaches and serves different motivational functions.

Progression System Design

The progression system is perhaps the most delicate design element in a creative simulator. Conventional game progression – leveling up, unlocking abilities, advancing through story chapters – can feel artificial or even counterproductive in a creative context, where the very notion of 'winning' is problematic [10]. Designers of creative simulators must therefore redefine what progression means in an expressive context.

Three models of creative progression have emerged in both academic research and commercial practice. The first is tool-based progression, where players unlock new creative instruments and capabilities as they demonstrate mastery of existing ones – preserving simplicity for beginners while rewarding expertise. The second is challenge-based progression, where players complete creative challenges of increasing complexity, with each challenge teaching a specific creative skill. The third is portfolio-based progression, where the player's accumulated creative works constitute their 'level,' and the quality and variety of the portfolio determines access to advanced features [11]. Table 2 compares these models across key design dimensions.

Table 2. Comparison of progression models for creative simulators

Dimension	Tool-Based	Challenge-Based	Portfolio-Based
Player Freedom	Moderate – gated by tool access	Low-Moderate – constrained by challenge rules	High – open-ended creation
Learning Scaffolding	High – tools introduced gradually	High – skill-targeted challenges	Low – self-directed learning
Motivation Type	Primarily extrinsic	Mixed	Primarily intrinsic
Suitability	Beginners and educational contexts	Structured skill development	Advanced players and hobbyists
Implementation Complexity	Low-Medium	Medium-High	High (requires evaluation system)

Game Environment and Aesthetic Design

The visual and auditory environment of a creative simulator has a profound effect on the player's creative mindset. Research in environmental psychology and creativity consistently shows that ambient aesthetics influence creative output: cluttered, high-stimulation environments can impair creative focus, while calm, visually harmonious spaces support generative thinking [12]. For a game simulator, this means that the UI, color palette, soundscape, and spatial layout of the workspace must be designed not merely for usability but for creative mood-setting.

Successful creative simulators often adopt one of two aesthetic strategies: the neutral studio (a clean, minimalist workspace that foregrounds the player's creation and recedes into the background) or the themed atelier (a richly detailed environment that provides creative inspiration and atmospheric immersion). The choice between these strategies should be informed by the target audience and the creative domain: beginners often benefit from a focused, uncluttered interface, while experienced creators may prefer a richly contextual environment [13].

Balancing Freedom and Structure

The central tension in creative simulator design is the balance between freedom and structure. Excessive freedom – a blank canvas with no guidance – leads to creative paralysis, especially for novice players who lack the domain knowledge to leverage the available tools [14]. Excessive structure, conversely, eliminates the sense of genuine creative authorship and transforms the simulator into a paint-by-numbers exercise. The optimal design creates what researchers call 'constrained freedom': a well-defined creative space with clear boundaries and rich internal variety.

Practical strategies for achieving constrained freedom include: thematic prompts that suggest a creative direction without dictating it; constraint challenges that deliberately limit the available tools to force creative problem-solving; and adaptive system responses that subtly narrow the creative space when a player is struggling and expand it when they are performing confidently. These strategies collectively form a dynamic design envelope that grows and adapts alongside the player [14].

Conclusions

This research paper has examined the key principles and approaches to game design of creative activity simulators. The analysis reveals that effective creative simulator design requires the simultaneous management of four interdependent design dimensions: creative mechanics, feedback systems, progression models, and environmental aesthetics. Each dimension must be calibrated to support genuine creative agency while providing the scaffolding and motivation that sustain long-term engagement.

The comparison of progression models demonstrates that no single approach is universally optimal. Tool-based progression suits educational contexts and beginners; challenge-based models are effective for structured skill development; and portfolio-based progression best serves advanced players driven by intrinsic motivation. In practice, the most robust creative simulators combine elements of all three models, switching between them dynamically as the player's level grows.

Future research should investigate the role of social and collaborative mechanics in creative simulators, the design of AI co-creation systems that act as creative partners rather than evaluators, and the application of adaptive difficulty principles to creative domains. As creative simulators continue to evolve, the principles outlined in this research paper provide a foundational framework for their design and evaluation.

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