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SYSTEM-CONDITIONED DIRECTING IN VIRTUAL PRODUCTION: RECONFIGURING DECISION-MAKING AND CREATIVE AUTHORITY

Gao Haoyuan¹, Sunghoon Cho^{2*}

^{1,2} *Visual Contents Department, Dongseo University, Busan, South Korea*

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Corresponding author: Sunghoon Cho
(mattcho@gdsu.dongseo.ac.kr)

ABSTRACT

How does virtual production restructure the exercise of directorial authority in contemporary filmmaking? While traditional accounts of directing emphasize either centralized authorship or collaborative negotiation among human agents, this article argues that virtual production introduces a system-conditioned mode of directing in which creative decisions are shaped by an integrated technological environment comprising software infrastructures, workflow protocols, and human-execution personnel. Through a comparative qualitative design combining process-based observation of an LED volume production with semi-structured practitioner interviews, the study yields three central findings. First, decision-making becomes temporally front-loaded. Second, decision-making becomes system-dependent. Third, authority operates as a conditional and cyclical structure, distributed across coordinated workflows when systems are stable, yet re-centralized in moments of technical instability. These findings suggest that directing in virtual production is best understood not as a fixed position of control, but as a situational practice embedded within dynamic technological systems. The article concludes by theorizing virtual production as a software-conditioned creative environment and discusses the broader implications of system-conditioned authority for film and media studies.

KEYWORDS: Virtual production, directorial authority, decision-making, system dependency, conditional authority.

1. INTRODUCTION

Virtual production technologies, including real-time rendering, LED volume environments, and previsualization pipelines, have fundamentally transformed contemporary filmmaking practices. By enabling the visualization and integration of digital environments during production, these systems collapse the boundaries between preproduction and on-set execution, introducing new forms of temporal coordination and technical dependency within the filmmaking process. Although existing research has examined how such technologies enhance visual capabilities and workflow efficiency, their implications for the structure of creative decision-making and directorial authority remain insufficiently theorized.

Classical accounts of directing, particularly within auteur theory, position the director as the central creative authority whose vision is realized through aesthetic control and on-set decision-making [1]. Even within production studies, where filmmaking is understood as a collaborative process, authority is typically framed as negotiated among human agents within institutional and industrial constraints. However, the emergence of virtual production complicates these assumptions by introducing software-driven infrastructures that actively structure when, how, and under what conditions creative decisions can be enacted.

Rather than simply redistributing authority across collaborators, virtual production reconfigures the decision-making architecture of filmmaking itself. Creative decisions are increasingly formulated in

advance, embedded within digital assets and system configurations, and executed within real-time computational environments. As a result, directing can no longer be adequately understood as either centralized authorship or collaborative negotiation alone; it must be reconceptualized in relation to the systemic conditions that organize creative action.

This article argues that virtual production gives rise to a system-conditioned model of directing, in which creative authority is structured by three interrelated transformations. First, decision-making becomes front-loaded, shifting from on-set improvisation to preproduction phases such as previsualization and pipeline configuration. Second, decision-making becomes system-dependent, requiring alignment with software architectures, rendering constraints, and technical workflows in order to be realized. Third, authority operates as a conditional and dynamically reconfigurable structure, distributed under stable system conditions and re-centralized during moments of technical instability.

Drawing on a comparative qualitative analysis of production observation and industry interviews, this study develops a conceptual framework that accounts for these transformations. By moving from empirical coding to structural abstraction, it identifies the underlying decision structures that shape directing practices in virtual production environments. In doing so, the article contributes to ongoing debates on authorship, labor, and technological mediation by foregrounding the role of computational systems as active participants in the organization of creative power.



Figure 1: Virtual Production Shooting Set

2. DIRECTORIAL AUTHORITY IN VIRTUAL PRODUCTION

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2.1. From Auteurism to Production Studies

Traditional film scholarship has long positioned the director as the central creative force. Classical auteur theory defines the director as a manager of "structural intelligence," whose personal style serves as the primary criterion for evaluating a work's artistic value [1], [2], [3]. Although subsequent research began to acknowledge the interaction between narrative structures and cultural contexts [4], this perspective has been widely criticized for over-romanticizing individual creativity while neglecting the collective and institutional dimensions of filmmaking.

Post-structuralist critiques challenged this central position through the concept of the "author-function," arguing that the director is not the sole source of meaning but rather a node within a broader discursive system [5], [6]. In contemporary industrial contexts, the director increasingly functions as a coordinator

within complex collaborative networks or even as a symbolic "brand" [7], [8]. Production Studies further develops this shift by foregrounding the organizational and institutional dimensions of filmmaking. Rather than locating creative authority in individuals, it emphasizes how authority is distributed across roles, routines, and industrial structures [9], [10].

While these approaches successfully decenter the individual author, they remain largely human-centered, focusing on interactions among creative personnel and institutional frameworks. The increasing integration of digital technologies into filmmaking, particularly in virtual production environments, introduces a different kind of mediation, in which decision-making is structured not only by human collaboration but also by technical systems and computational infrastructures. Existing frameworks, however, offer limited tools for explaining how such systems actively organize the conditions under which creative decisions are made and realized.

To provide a clearer distinction between these two modes of authority, Table 1 summarizes their key differences across four critical dimensions.

Table 1: Conceptual Comparison Between Distributed Authority And System-Conditioned Authority

Dimensions of Comparison	Distributed Authority	System-Conditioned Authority
Source of Power	Professional expertise and creative prestige of human agents (e.g., Director, DoP, VFX Supervisor).	Software architecture, algorithmic logic, and hardware performance thresholds (e.g., Real-time engine limits).
Operational Logic	Social negotiation, functional division of labor, and on-set interpersonal communication.	Pre-defined workflow protocols, asset locking, and real-time rendering constraints.
Director's Role	The central coordinator and final arbiter within a social network of power.	A decision-making feedback agent embedded within a technological milieu.
Nature of Constraints	Social and Contingent: Arising from human collaboration and professional consensus.	Structural and Systemic: Arising from the rigid boundaries of the technical infrastructure.

2.2. Governance and Infrastructural Coordination in Virtual Production

To address the limitations of human-centered models, this study conceptualizes virtual production as a system-mediated environment in which directorial authority operates through the structuring of conditions rather than direct command. Before engaging the notion of governmentality, it is necessary to clarify what the term "system" designates in this study. In the context of virtual production, the system that conditions directorial authority is not a singular technological entity, but a stratified assemblage operating across three interdependent layers. The first is the software layer, comprising real-time rendering engines, asset pipelines, tracking infrastructures, and the interface-based environments through which creative options are parameterized and executed. The second is the workflow layer, which encompasses the protocols, procedural sequences, approval nodes, and

temporal architectures that structure how and when decisions move through the production pipeline. The third is the human-execution layer, consisting of the technical personnel, most notably VP supervisors, virtual art department artists, and real-time operators, whose interpretative and translational labor converts directorial intention into system-compatible operations. These three layers do not function independently; they are tightly coupled, such that a modification in creative intent at the human layer must be validated at the software layer and rerouted through the workflow layer before it can be realised.

Crucially, the director is not positioned outside this tripartite system. Rather, the director operates from within it, yet occupies a structurally distinct position: while technical personnel function as nodes that maintain system operability, the director serves as the initiating source of creative intentionality whose realisation is nevertheless contingent upon alignment

across all three layers. It is precisely this asymmetric positioning, intention originating from the director, but feasibility distributed across software, workflow, and human-execution layers, that defines the system-conditioned character of directorial authority in virtual production.

Drawing on the notion of governmentality, authority is understood as the organization of a "milieu" that shapes possible actions: the "conduct of conduct" [11], [12]. In virtual production, this milieu takes the form of an integrated technological environment composed of real-time rendering systems, tracking infrastructures, and LED volumes, within which creative decisions are both enabled and constrained.

Within this environment, technological systems function not merely as tools but as structuring conditions of decision-making. The boundary between external constraint and internal intention becomes increasingly blurred, as technical operations are incorporated into creative processes. In this sense, directing unfolds within a system where creative intent is continuously mediated by computational logic and operational requirements.

This structuring effect is further reinforced at the infrastructural level. Workflows, pipelines, and software interfaces operate as largely invisible frameworks that stabilize and regulate production practices [13], [14]. These infrastructures do not simply support image production; they organize how decisions are formulated, coordinated, and implemented. As a result, directing becomes inseparable from the management of infrastructural conditions.

At the same time, decision-making is distributed across interconnected human and technical actors. However, this distribution is not horizontal but structured through system requirements, feedback loops, and operational constraints. Rather than representing a simple diffusion of authority, this configuration reflects a system-organized mode of coordination in which the range of possible actions is conditioned by technical compatibility and workflow alignment.

Taken together, these perspectives indicate that directorial authority in virtual production is not merely redistributed, but restructured through system-based conditions. Authority operates through the configuration of environments, the alignment of technical processes, and the navigation of infrastructural constraints. This shift points toward a form of directing embedded within system-conditioned decision structures, which will be examined in the following sections.

3. METHODOLOGY AND RESEARCH DESIGN

3.1. Research Design

This study adopts a comparative, case-oriented qualitative research design to investigate how virtual production restructures directorial authority and decision-making processes. Rather than relying on a single empirical source, the research combines process-based observation with industry interviews, enabling a multi-layered analysis of both situated practice and broader industrial conditions.

At the center of the empirical investigation is the *Dream Echoes* production, which is a teaching item serving as a process-oriented case for examining the operational dynamics of LED volume workflows. Through on-site observation and process tracing, the study captures how creative decisions are organized across different stages of production, with particular attention to previsualization, system configuration, and on-set execution. This case provides detailed insight into the temporal and procedural dimensions of decision-making within a controlled production environment.

To complement this situated perspective, the study incorporates industry interviews conducted with virtual production practitioners, including directors and VP supervisors associated with the Thai company Kantana. These interviews provide an external, industry-level viewpoint that extends beyond a single production context, highlighting recurring patterns related to pipeline constraints, technical mediation, and system-dependent workflows. By introducing this second empirical layer, the research moves from localized observation toward analytical generalization, allowing findings to be situated within a broader field of practice.

The combination of these two empirical sources is not intended to produce statistical generalizability, but to enable conceptual generalization through comparative analysis. The *Dream Echoes* case offers processual depth, while the Kantana interviews provide structural validation across different production contexts. Together, they form a complementary research design in which internal process analysis and external industry insight are brought into dialogue.

This comparative, case-oriented approach is particularly suited to the study's objective of identifying underlying decision structures within virtual production. By examining how similar patterns emerge across distinct empirical contexts, the research is able to move beyond descriptive accounts of individual projects and toward the abstraction of recurring structural conditions. In this sense, the research design is aligned with a broader

methodological goal: not merely to document of directing in contemporary media production practices, but to theorize the systemic reconfiguration environments.

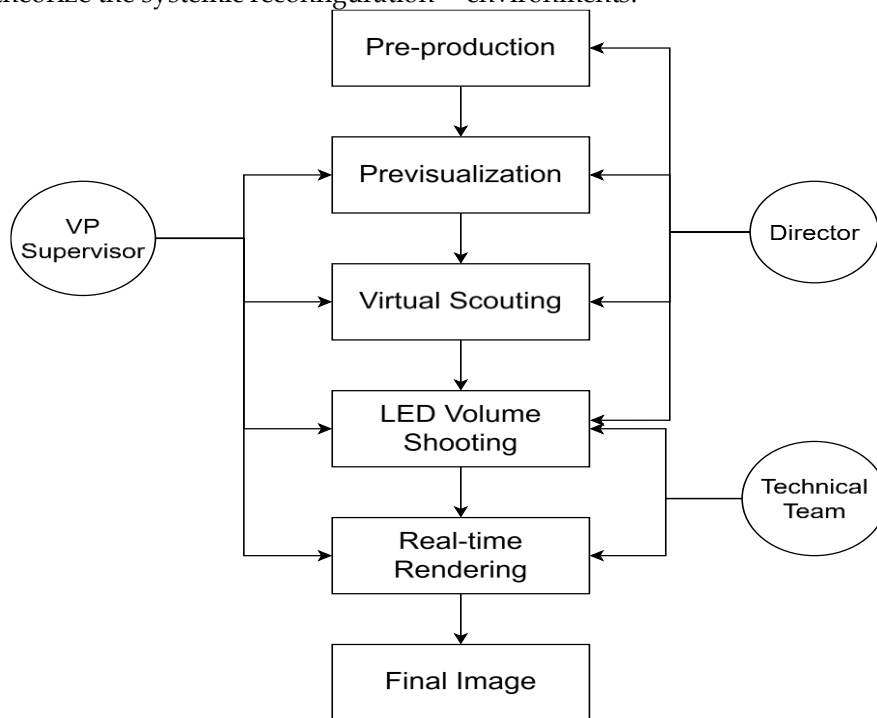


Figure 2: Virtual Production Workflow Diagram

3.2. Data Collection

Data for this study were collected from two complementary sources: process-based production observation and industry interviews. These data sources were selected not for redundancy, but for their distinct analytical functions, enabling the study to capture both the situated dynamics of decision-making and the broader structural conditions of virtual production workflows.

The first source consists of observational data gathered during the production of *Dream Echoes*, a teaching based virtual production project utilizing an LED volume environment. The data were generated through on-site observation of key production stages, including previsualization sessions, virtual art department (VAD) development, system configuration, and principal photography. Rather than focusing on isolated events, the observation was conducted as process tracing, with particular attention to how decisions emerged, were negotiated, and became operationalized across different stages of the workflow. This dataset provides detailed insight into the temporal sequencing and procedural organization of decision-making within a concrete production setting.

The second source comprises semi-structured interviews conducted with virtual production practitioners, including directors and VP supervisors affiliated with the Thai company Kantana. These

interviews focus on practitioners' experiences with LED volume workflows, pipeline coordination, and system-related constraints in professional production contexts. The purpose of this dataset is not to replicate the *Dream Echoes* case, but to introduce an industry-level perspective that highlights recurring patterns beyond a single project. In particular, the interviews provide critical insight into issues such as pipeline dependency, technical mediation, and the practical limits of creative flexibility under system constraints.

Importantly, the two datasets are analytically differentiated in their roles. The observational data function as a process-oriented account of how decision-making unfolds within a specific production environment, enabling close analysis of temporal structure and workflow organization. In contrast, the interview data serve as a form of structural validation, allowing patterns identified in the case study to be examined in relation to broader industry practices. This division of analytical labor ensures that the study moves beyond localized description toward conceptual generalization.

By combining these data sources, the study constructs an empirical foundation for identifying recurring patterns in decision timing, system dependency, and situational variation. Rather than treating data collection as an end in itself, the design is oriented toward enabling the abstraction of underlying decision structures, which form the basis

of the analytical framework developed in the following sections.

3.3. Analytical Strategy

The analytical strategy of this study is designed to move from empirical observation to theoretical abstraction, with the aim of identifying underlying structures that organize decision-making in virtual production. While the analysis is grounded in qualitative coding procedures, it extends beyond thematic categorization toward the construction of conceptual models that capture the systemic logic of directing practices.

The analysis proceeded in three stages. First, an open coding process was conducted on both observational notes and interview transcripts to identify recurring elements related to decision-making processes [15]. These initial codes focused on concrete aspects of production practice, including moments of decision formation, instances of technical constraint, coordination across departments, and responses to system instability.

Second, these codes were organized through axial coding, which aimed to establish relationships between categories and to trace how decision-making unfolded across different stages of the production workflow. Particular attention was given to linking temporal sequences (e.g., previsualization, system configuration, on-set execution) with operational conditions (e.g., rendering limitations, pipeline dependencies, tracking stability). This stage enabled the identification of patterned relationships between decision timing, technical mediation, and workflow organization.

The third stage constitutes the central methodological contribution of the study: a process of structural abstraction. Rather than treating coded themes as final analytical outcomes, the analysis

synthesizes recurring patterns into higher-level conceptual constructs that describe the systemic organization of decision-making. Through this process, three interrelated dimensions were derived: (1) a front-loaded decision-making structure, capturing the temporal displacement of decision-making toward preproduction; (2) system-dependent decision-making, describing the reliance of creative action on system validation and technical feasibility; and (3) conditional authority, indicating the situational variability of authority under stable and unstable system conditions.

Importantly, coding in this study functions as an intermediate analytical step, rather than an end in itself. The goal of the analysis is not to produce an exhaustive taxonomy of themes, but to identify the structural logic that underpins observed practices. In this sense, the analytical strategy aligns with a theory-generative approach, in which empirical data are used to construct explanatory models rather than merely to illustrate pre-defined categories.

The integration of observational and interview data further strengthens this abstraction process. Patterns identified through process tracing in the *Dream Echoes* case were cross-examined against industry perspectives derived from practitioner interviews, allowing for the refinement and validation of emerging concepts. This iterative movement between empirical material and conceptual formulation ensures that the resulting model is both grounded in practice and analytically generalizable.

Through this multi-stage analytical process, the study moves from descriptive accounts of production workflows to a systematic account of how directing is restructured under virtual production conditions. The resulting framework provides the basis for the findings presented in the following chapter.

Table 2: Analytical Framework Derived from Qualitative Coding

Analytical Category	Subthemes	Analytical Focus
Authority Reframing (Director)	leadership continuity; coordination discourse; authority modality shift	Re-articulation of creative leadership under system mediation
Governance-Based Integration	distributed creativity; narrative coherence; fragmentation management	Centralized integration of distributed creative labor
System Mediation and Technical Governance (VP Supervisor)	translation labor; pipeline coordination; system risk governance; constraint mediation; pre-production alignment	VP supervisors as operational governance nodes bridging creative intent and technical execution

4. FINDINGS

4.1. From Creative Authority to System-Conditioned Authority

Interviews and observational data from virtual production workflows indicate that directorial authority is not simply diminished by technological intervention, but fundamentally reconfigured under

system-conditioned constraints. Rather than operating as an autonomous source of creative command, the director’s authority becomes embedded within a technological environment that structures when, how, and to what extent decisions can be enacted.

From the perspective of directors, this transformation is often framed in terms of continuity

rather than rupture. In interviews conducted during the *Dream Echoes* production, the director emphasized that the core responsibility of directing remains unchanged: to coordinate multiple departments toward a unified creative vision. From this viewpoint, virtual production appears as an extension of an already collaborative mode of filmmaking, in which authority is exercised through communication rather than direct execution. The director's role is thus articulated as integrative, aligning diverse contributions into a coherent audiovisual outcome.

However, this discourse of continuity is complicated by the structural conditions introduced by virtual production systems. Industry practitioners point out that creative decisions are increasingly shaped by software environments, real-time rendering pipelines, and asset-based workflows that delimit the range of actionable options. In such contexts, authority is not simply expressed through communicative coordination, but must operate within a predefined field of technical affordances, where feasibility is conditioned by system parameters rather than solely by artistic intent.

Observations from the *Dream Echoes* project further illustrate this shift. Many key creative elements, such as environmental design, camera movement, and lighting configurations, were established through previsualization and system calibration prior to shooting. These decisions functioned not merely as provisional plans, but as operational constraints that structured subsequent on-set execution. While the director retained the ability to request modifications, such interventions were contingent upon rendering compatibility, tracking stability, and system latency. As a result, directorial agency was simultaneously preserved in its conceptual scope and restricted in its practical realization.

This tension between conceptual authority and operational constraint reflects a deeper transformation in the conditions of creative practice. Within software-driven production environments, creative action is increasingly mediated by interfaces, parameterized options, and procedural workflows that translate artistic intention into executable operations. In this sense, the director no longer operates over an open field of possibilities, but within a system-structured decision space, where choices are both enabled and limited by the underlying technological architecture.

Taken together, these findings suggest that directorial authority in virtual production should be understood not as a stable property of the filmmaker, but as a system-conditioned practice. Authority persists as a central organizing function, but it is exercised through negotiation with technological

systems that structure the timing, feasibility, and implementation of creative decisions. This shift from autonomous command to system-conditioned operation establishes the foundation for the structural transformations of decision-making examined in the following section.

4.2. Front-Loaded Decision-Making Structure

Building on the system-conditioned nature of directorial authority outlined above, virtual production introduces a fundamental transformation in the temporal organization of creative decision-making. Rather than being enacted primarily during on-set production, key creative decisions are systematically shifted upstream into preproduction phases such as previsualization, virtual art department (VAD) development, and pipeline configuration. This study conceptualizes this transformation as a front-loaded decision-making structure.

In contrast to traditional filmmaking, where preproduction serves as a preparatory stage that supports but does not determine on-set creative execution, virtual production embeds directorial decisions into the technical and material infrastructure prior to shooting. Within LED volume workflows, elements such as environment design, camera trajectories, lighting schemes, and asset configurations are not merely planned in advance but encoded into digital assets and real-time rendering systems. Once integrated into the production pipeline, these elements function as operational parameters that guide, constrain, and stabilize subsequent execution.

Observational data from the *Dream Echoes* production provide clear evidence of this shift. During previsualization sessions and virtual scouting, creative choices were progressively fixed through iterative calibration between artistic intent and technical feasibility. By the time of principal photography, these decisions had been translated into system-compatible configurations, including predefined camera paths, calibrated lighting presets, and synchronized rendering conditions. As a result, on-set production was no longer the primary site of creative decision-making, but rather a stage of parameter execution within a preconfigured system.

Industry interviews further corroborate this structural transformation. Practitioners consistently emphasize that deviations from pre-established configurations during shooting are both technically costly and operationally disruptive, often requiring reprocessing across the pipeline. Consequently, creative risk is redistributed toward earlier stages of production, where decisions must be stabilized in order to ensure real-time performance and workflow

continuity. This shift is frequently described in practice as a necessity to “resolve problems before shooting,” reflecting a broader reorientation of creative labor toward anticipatory alignment rather than reactive adjustment.

Importantly, the front-loaded decision-making structure is not simply an intensification of traditional planning practices. Its distinctiveness lies in the binding relationship between decision and system execution. Whereas conventional preproduction allows for flexible reinterpretation during shooting, decisions made within virtual production are materially embedded within digital assets and technical configurations, making them resistant to spontaneous alteration. In this sense, the temporal displacement of decision-making is inseparable from its structural fixation within the production system.

This transformation has significant implications for the exercise of directorial authority. While the director retains conceptual control over the creative vision, the locus of effective decision-making shifts away from the immediacy of on-set intervention toward earlier stages of system configuration. Authority thus becomes increasingly dependent on the ability to anticipate constraints, coordinate across departments, and align creative intent with technical parameters in advance. Directing, in this context, is redefined as a practice of anticipatory system design, rather than real-time command.

Taken together, these findings demonstrate that virtual production reorganizes creative decision-making through a front-loaded structure in which authority is exercised before rather than during shooting. This temporal reconfiguration not only alters the workflow of production, but also establishes the conditions for a more deeply system-dependent mode of decision-making, to be examined in the following section.

4.3. System-Dependent Decision-Making and Technical Mediation

While the front-loaded structure of virtual production reorganizes *when* decisions are made, an equally significant transformation concerns how decisions become actionable within the production process. In virtual production environments, creative decisions are no longer independently generated and directly executed by the director; rather, they must be validated, translated, and implemented within system-defined parameters. This study conceptualizes this condition as system-dependent decision-making.

Under this structure, the realization of creative intent is contingent upon a set of interlocking technical conditions, including software architecture, rendering capacity, asset compatibility, and pipeline

synchronization. Decisions do not enter the production workflow as autonomous directives, but as proposals that require system-level feasibility. In this sense, the system does not simply execute decisions; it actively filters, shapes, and constrains the range of decisions that can be realized.

Observational data from the *Dream Echoes* production illustrate this dependency. During both preproduction and on-set adjustments, creative proposals, such as modifying environmental elements, adjusting lighting conditions, or altering camera movement, were subject to continuous evaluation in relation to rendering constraints, tracking stability, and asset integration. In many instances, what appeared as a straightforward creative adjustment at the conceptual level required extensive recalibration across the pipeline, or was deemed impractical within existing system configurations. As a result, decision-making unfolded as an iterative process of negotiation between intention and feasibility, rather than unilateral execution.

Industry interviews further substantiate this dynamic by highlighting the role of technical mediation in structuring decision-making processes. Practitioners emphasize that certain creative options become effectively unavailable once production enters a stabilized pipeline state, as modifications may require reprocessing multiple interconnected subsystems. In such contexts, technical assessment operates as a form of “technical veto,” delimiting the range of actionable decisions without necessarily negating the director’s conceptual authority. As one VP supervisor noted, even minor changes can cascade across the system, transforming a simple request into a resource-intensive reconfiguration. Decision-making, therefore, is governed not only by creative judgment but by system compatibility.

This dependency is further institutionalized through the emergence of intermediary roles, particularly the VP supervisor, who functions as a mediating agent between creative intent and system execution. Rather than merely implementing instructions, the VP supervisor interprets directorial requests, translates them into technically viable operations, and evaluates their feasibility within the constraints of the pipeline. This mediation can be understood as a structured sequence of request-translation-validation-execution, through which creative intent is reformulated into system-compatible actions. Authority, in this process, becomes distributed across human and technical agents, rather than residing exclusively with the director.

Importantly, system-dependent decision-making does not imply the disappearance of directorial

authority. Instead, it reveals a transformation in the conditions under which authority operates. The director retains a central role in defining the conceptual direction of the work, but the realization of that direction is contingent upon alignment with system parameters and technical processes. Authority is thus exercised not through direct command, but through the capacity to navigate constraints, anticipate system responses, and coordinate across interdependent components.

Taken together, these findings indicate that decision-making in virtual production is fundamentally conditioned by system structures. Creative choices emerge not as isolated acts of individual intention, but as outcomes of a distributed process in which software systems, technical workflows, and human agents collectively determine what can be realized. This system-dependent mode of decision-making extends the front-loaded structure identified in the previous section and establishes the basis for understanding authority as a situational and dynamically reconfigurable practice, to be further examined in the following section.

4.4. Conditional Authority and the Cyclical Logic of System-Based Directing

The preceding analysis has demonstrated that virtual production reorganizes directing through a front-loaded temporal structure and a system-dependent mode of decision-making. Taken together, these transformations point to a further implication: directorial authority in virtual production operates not as a stable or uniformly distributed condition, but as a situational and dynamically reconfigurable structure. This study conceptualizes this condition as conditional authority.

Under stable production conditions, authority is operationally distributed across a network of roles, workflows, and technical systems. Decision-making unfolds through coordinated processes in which creative intent is aligned with system parameters and executed through infrastructural mediation. In this state, the director's authority is exercised primarily through anticipatory coordination and system alignment, rather than through immediate, on-set intervention.

However, this distributed configuration is contingent upon the continuous functioning of the underlying system. When key technical components, such as tracking, rendering, or synchronization, become unstable, the coordinated workflow that supports distributed decision-making is disrupted. Observations from the *Dream Echoes* production

indicate that, in such moments, preconfigured parameters lose their operational reliability, and the structured decision environment collapses into a state of uncertainty. Under these conditions, decision-making shifts away from distributed coordination toward a more immediate and centralized mode of intervention, as the director and key technical personnel prioritize system recovery and the restoration of operational continuity.

Industry interviews further confirm that system instability effectively suspends the normal logic of pipeline-based coordination. When real-time performance cannot be maintained, production is temporarily halted, and the priority of decision-making is reoriented from creative refinement to infrastructural stabilization. In this context, authority is not exercised through negotiation within predefined parameters, but through situational intervention in response to system failure. The distributed governance structure identified in earlier sections is thus revealed to be conditional upon system stability.

Importantly, this re-centralization of authority does not represent a simple return to pre-digital forms of directorial control. Rather, it constitutes a temporary and context-specific reconfiguration, in which authority is concentrated to address breakdown before being redistributed once system functionality is restored. This dynamic reveals that directing in virtual production operates through a cyclical logic, oscillating between phases of distributed coordination and moments of concentrated intervention.

Taken together, the findings of this chapter suggest that directing in virtual production is structured by three interrelated transformations: (1) decision-making is front-loaded into preproduction and system configuration; (2) decision-making is dependent on system validation and technical mediation; and (3) authority operates as a conditional and cyclical structure, distributed under stable conditions and re-centralized during breakdown. These dynamics indicate a fundamental shift from director-centered control toward a form of system-based governance, in which authority is embedded within, and continuously shaped by, the operational state of technological infrastructures.

This model of conditional and system-conditioned authority provides a basis for rethinking directing not as a fixed position of control, but as a situational practice embedded within dynamic production systems, the broader implications of which are discussed in the following chapter.

Table 3: Analytical Framework Derived from Qualitative Coding

Dimension	Traditional Production	Virtual Production
Decision timing	On-set decision making	Pre-production alignment
Authority mode	Direct command	Workflow coordination
Creative control	Immediate visual supervision	System parameter management
Technical mediation	Limited	Extensive
Collaboration	Departmental hierarchy	Infrastructure-based coordination

5. CONCLUSION

5.1. Reinterpreting Directorial Authority in Systemic Terms

The findings presented in the previous chapter call for a fundamental reconsideration of how directorial authority is conceptualized within film and media studies. Rather than treating authority as an inherent property of the filmmaker or as a function of interpersonal coordination, this study demonstrates that authority in virtual production is increasingly conditioned by systemic structures that shape the temporal organization, feasibility, and execution of creative decisions.

Classical formulations of directorial authority, most prominently articulated within auteur theory, have historically emphasized the director as the primary creative origin, whose vision is inscribed onto the film through stylistic coherence and authorial control. Even within production studies, where attention has shifted toward collaborative labor and industrial organization, authority is often framed as a matter of negotiation among human agents operating within institutional constraints. In both perspectives, authority ultimately remains anchored in human intentionality, whether singular or distributed.

The analysis of virtual production workflows complicates this assumption by demonstrating that authority is not only negotiated among individuals but is also structured by technological systems that delimit the conditions under which decisions can be realized. As shown in Chapter IV, creative decisions are front-loaded into preproduction, rendered dependent on system validation, and subject to conditional reconfiguration in moments of instability. These transformations indicate that authority is no longer adequately described in terms of authorship or coordination alone, but must be understood as operating within a system-conditioned decision environment.

From this perspective, the director’s role is neither diminished nor simply redistributed; rather, it is repositioned within a hybrid assemblage of human and technical actors. Authority emerges not as a stable possession, but as an effect of alignment between creative intent and system compatibility. The director retains a central function in articulating vision and

coordinating production, yet the realization of that function is contingent upon navigating infrastructural constraints, anticipating technical limitations, and working within preconfigured operational frameworks.

This reconceptualization suggests that directorial authority in virtual production is best understood not as a fixed locus of control, but as a relational and system-dependent practice. It is exercised through the capacity to operate within, and in relation to, complex technological environments that both enable and delimit creative action. In this sense, authority shifts from being a matter of command to a matter of systemic positioning, where the effectiveness of directing depends on how well creative intentions are integrated into the logic of the production system.

By reframing authority in systemic terms, this study contributes to ongoing debates in film and media theory by extending the analysis of authorship and collaboration into the domain of technological mediation. It foregrounds the need to account for software-driven infrastructures, real-time rendering systems, and pipeline-based workflows as active participants in the organization of creative power. This shift provides the conceptual foundation for further examining virtual production as a software-conditioned creative environment, which will be explored in the following section.

5.2. Virtual Production as a Software-Conditioned Creative Environment

The systemic transformations identified in this study can be more fully understood by situating virtual production within the theoretical frameworks of software and platform studies. Rather than functioning merely as a set of technical tools, virtual production operates as a software-conditioned environment in which creative decisions are structured, constrained, and operationalized through computational systems.

As Lev Manovich has argued, software should be understood not simply as an instrument for executing pre-existing intentions, but as a cultural layer that shapes the logic of media production itself [16]. Within this perspective, software defines the parameters of what can be created, how processes are organized, and how creative actions are translated into executable forms. Applied to virtual production, this insight

suggests that the real-time engines, asset pipelines, and interface-based workflows do not merely support directing, but actively structure the field of creative possibility.

A similar shift can be observed in platform-oriented analyses, such as those proposed by Nick Srnicek, where digital systems are understood as infrastructures that organize and mediate activity through standardized protocols and data-driven coordination [17]. Although virtual production differs from commercial platforms in its industrial context, it shares a comparable logic in that creative processes are increasingly routed through integrated, rule-based systems that regulate access, compatibility, and execution. In this sense, the production pipeline itself functions as a form of infrastructural governance, organizing not only workflow but also the conditions under which decisions can take effect.

From this theoretical standpoint, the empirical findings of this study can be reinterpreted as manifestations of a deeper structural condition. The front-loaded decision-making structure identified reflects the way software systems require decisions to be formalized and encoded in advance in order to ensure real-time performance. The system-dependent decision-making analyzed corresponds to the necessity of translating creative intent into system-compatible operations, subject to constraints imposed by rendering engines, asset integration, and pipeline synchronization. Finally, the conditional nature of authority discussed reveals the extent to which creative control depends on the operational stability of the underlying system.

Taken together, these dynamics indicate that virtual production should be understood not as a hybrid between traditional filmmaking and digital enhancement, but as a fundamentally software-conditioned mode of production. In this environment, creative authority is neither fully centralized nor simply distributed among collaborators; rather, it is embedded within and mediated by computational structures that govern the temporal, procedural, and operational dimensions of filmmaking.

This perspective has important implications for how directing is conceptualized. If software systems define the conditions under which creative decisions are made and realized, then directing can no longer be understood solely in terms of human intentionality or collaborative negotiation. Instead, it must be approached as a practice of operating within and through software-defined environments, where creative agency is exercised in relation to algorithmic processes, interface constraints, and infrastructural dependencies.

In this sense, virtual production marks a shift toward what may be described as a software-conditioned paradigm of directing, in which the director functions not only as a coordinator of human labor, but as an agent who must engage with, anticipate, and strategically navigate the logic of computational systems. This reconceptualization extends existing debates in film and media studies by foregrounding the role of software as an active participant in the organization of creative power, rather than a neutral medium of execution.

5.3. Toward a System-Conditioned Model of Directing

Bringing together the empirical analysis and theoretical discussion, this study advances a system-conditioned model of directing that reconceptualizes how creative authority operates in virtual production environments. Rather than locating authority solely in the director or distributing it exclusively among human collaborators, the model demonstrates that directing is organized through the interaction between creative intent and computational systems that structure when, how, and under what conditions decisions can be realized.

At the core of this model are three interrelated transformations. First, directing operates through a front-loaded temporal structure, in which key creative decisions are formulated, tested, and fixed during preproduction phases such as previsualization and pipeline configuration. This temporal displacement shifts the locus of effective decision-making away from on-set improvisation toward anticipatory system alignment.

Second, decision-making becomes system-dependent, requiring that creative intent be translated into forms compatible with software architectures, rendering engines, and asset pipelines. Under these conditions, decisions are not directly executed but must pass through processes of validation, mediation, and technical feasibility assessment. Creative agency is thus exercised within a system-structured decision space, where possibilities are simultaneously enabled and constrained by computational parameters.

Third, authority operates as a conditional and cyclical structure. Under stable system conditions, decision-making is distributed across coordinated workflows and technical infrastructures. In moments of instability or breakdown, however, this distributed configuration is temporarily suspended, and authority becomes re-centralized to restore operational continuity. Directing therefore unfolds through an ongoing oscillation between phases of distributed coordination and concentrated intervention.

Taken together, these three dimensions, front-loaded temporality, system-dependent execution, and conditional authority, constitute a model in which directing is neither a fixed position of control nor a purely collaborative negotiation, but a situational practice embedded within dynamic, software-conditioned systems. Authority in this framework is best understood as an *emergent effect* of alignment between human intention and system operability [18], rather than as a stable attribute possessed by any single agent.

This model has broader implications for film and media theory. It suggests that existing paradigms centered on authorship or collaboration must be extended to account for the structuring role of computational infrastructures in shaping creative work. In particular, it foregrounds the need to conceptualize directing as a practice that operates across human and non-human domains, where software systems actively participate in organizing creative power.

More broadly, the system-conditioned model of directing contributes to ongoing discussions about the transformation of cultural production in digitally mediated environments. By demonstrating how authority is temporally reorganized, structurally constrained, and situationally reconfigured, the study provides a framework for analyzing not only virtual production, but also other forms of media practice in which creative processes are increasingly embedded within complex technological systems.

In conclusion, directing in virtual production should be understood as a system-conditioned, temporally displaced, and dynamically reconfigurable practice, in which creative authority emerges through continuous negotiation with the operational logic of computational infrastructures. This perspective opens new avenues for research into the evolving relationship between human creativity and technological systems in contemporary media production.

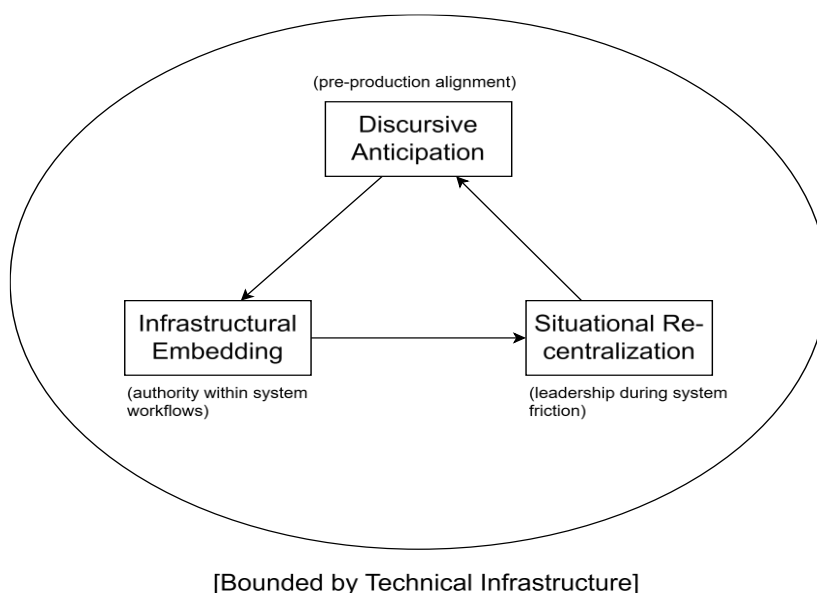


Figure 3: Bounded Governance Model

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