

DYNAMICS OF CREATIVE PROBLEM-SOLVING WITHIN LAST PLANNER SESSIONS

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ABSTRACT

Lean Construction emphasizes reliable workflow, collaboration, and continuous improvement through structured planning practices such as the Last Planner System (LPS). Within this context, collaborative planning is a dynamic process in which project teams collectively respond to uncertainty, constraints, and changing site conditions. This study examines collaborative planning dynamics in LPS environments, focusing on interaction patterns and participants' experiences related to creative problem-solving. An interpretive research approach is adopted, combining analysis of how communication unfolds among participants in LPS planning sessions with post-session survey and sentiment data collected from these construction professionals. Communication interaction data were analyzed to identify temporal patterns of participation, coordination, and engagement during problem-solving episodes. Survey responses captured participants' perceptions of creativity, motivation, innovation, and frustration within Lean planning processes. Results indicate that collaborative planning in LPS sessions is structured yet adaptive, shaped by creative dynamics. Creative problem-solving typically emerges through intensified interaction, akin to creative speech (spontaneous, unscripted verbal exchanges), in which a small number of participants initiate solutions and others contribute through responsive coordination, as measured by patterns such as turn-taking balance and idea-building sequences. These findings offer practical insights for improving facilitation and collaboration in Lean planning under uncertainty.

KEYWORDS

Lean Construction, Last Planner System, collaborative planning, creativity, problem-solving.

INTRODUCTION

Construction projects are inherently complex and uncertainty-driven, involving high financial stakes, tight schedules, and coordination among diverse professional teams. Project environments are continuously influenced by design changes, material availability, weather conditions, labour constraints, and regulatory requirements. These uncertainties directly affect project performance in terms of cost, time, quality, and safety.

Many uncertainties emerge during execution that are difficult to anticipate during formal planning, limiting the effectiveness of predictive scheduling approaches (De Meyer et al., 2002). As a result, construction teams frequently encounter situations in which predefined plans must be adjusted during on-site construction operations. In such situations, teams rely on

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collaborative interaction to identify constraints, negotiate alternatives, and coordinate adaptive responses.

Lean Construction addresses these challenges by emphasizing collaboration, workflow reliability, and continuous improvement. The Last Planner System (LPS) is a core Lean planning framework that places responsibility for planning and commitment-making with those closest to the work (Ballard & Howell, 1994). Through lean practices such as pull planning and look-ahead planning, LPS enables project participants to collectively plan work, identify constraints, and align commitments.

Despite its structured nature, LPS planning frequently requires immediate responses when uncertainties arise. These instant responses often involve creative problem-solving through dialogue to generate ideas and build solutions, rather than strict adherence to predefined solutions. While improvisation, decision making, and adaptive planning have been acknowledged in construction research (Hamzeh et al., 2012), there is limited empirical research examining how creativity for problem-solving emerges through interaction during LPS planning sessions.

This study examines the dynamics of collaborative planning within LPS environments as an interaction-driven process. Creativity is examined not as technical deviation or unsafe solution, but as the collective identification of constraints, exploration of alternatives, and adaptive coordination within established planning frameworks.

Research Question: What interactional dynamics exist within team-based LPS planning sessions that reflect creativity during collaborative problem-solving?

Contributions: This paper conceptualizes creative problem-solving in construction planning as an interaction-driven process within LPS sessions and provides an interpretive analysis of participation, coordination, and engagement patterns in planning meetings. It also offers practice-oriented insights to strengthen collaborative planning under uncertainty by foregrounding communicative processes that support adaptive problem-solving.

BACKGROUND AND LITERATURE

Construction planning is inherently uncertain due to variability in resources, site conditions, and external influences. Research distinguishes uncertainty from risk, emphasizing that many project conditions cannot be fully anticipated or quantified in advance (De Meyer et al., 2002). Constraint-based planning approaches improve reliability but still require adaptive responses when unforeseen conditions arise (Chua et al., 2003).

Lean Construction developed Last Planner System (LPS) aims to improve project performance by reducing variability, improving workflow reliability, and strengthening collaboration among project participants. The Last Planner System (LPS) was introduced to stabilize production planning by shifting responsibility to those who execute the work (Ballard & Howell, 1994). LPS emphasizes commitment-based planning, systematic identification of constraints, and continuous learning (Ballard, 2000). LPS consists of five planning phases: master planning, phase (pull) planning, look-ahead planning (make-ready), weekly work planning, and daily coordination and learning. Among these phases, **pull planning and look-ahead planning** are particularly collaborative, requiring intensive interaction among trades to negotiate sequencing, identify constraints, and align commitments. These sessions require participants to coordinate sequencing, negotiate dependencies, and identify constraints that may affect upcoming work. As such, they represent key moments where problem-solving occurs through collective discussion.

Pull Planning Phase: Pull planning represents the second stage of the last planner system and is commonly referred to as phase planning. Tommelein et al. 1997 demonstrated the use of resource pulling practices to improve the reliability of Lookahead planning (Chua et al., 2003).

Look Ahead Phase: Lookahead planning is the third step of LPS and a collaborative process that anticipates future events or obstacles and devises strategies to address them before they occur. The lookahead planning process is an intermediate process that follows front-end planning and precedes production planning (Hamzeh et al., 2012).

This study conducted a brief literature review on prior innovations in lean construction, LPS and creative problem-solving for an empirical understanding.

Table 1: Prior research on Lean construction, LPS, and creative problem-solving

Authors	Approach	Innovation Introduced	Major Contribution
(Ballard & Howell, 1994)	Lean Construction / Production Control	Introduced collaborative planning through commitment-based workflow	Established foundational LPS principles to stabilize workflow and reduce variability
(Ballard, 2000)	Lean Production Theory	Formalized LPS as a production control system	Defined the five phases of LPS and reframed planning as a social and collaborative process
(Tommelein & Ballard, 1997)	Pull-Based Planning	Introduced pull logic and constraint screening	Demonstrated how backward planning improves coordination and work readiness
(Chua et al., 2003)	Constraint-Based Planning	Integrated systematic constraint identification into look-ahead planning	Showed how proactive constraint removal improves planning reliability
(De Meyer et al., 2002)	Project Uncertainty Management	Differentiated types of project uncertainty	Expanded uncertainty management beyond traditional risk-based models
(Faek, 2015)	Construction Improvisation	Classified types of construction improvisation	Identified characteristics and triggers of improvisation under project uncertainty
(Hamzeh et al., 2012)	Lean and Improvisation	Examined compatibility of improvisation with LPS	Provided early empirical evidence of improvisation within look-ahead planning
(Hamzeh et al., 2018)	Empirical Lean Studies	Measured improvisation in construction practice	Demonstrated that improvisation is systematic and recurring rather than ad hoc
(Hadida et al., 2015)	Organizational Improvisation Theory	Synthesized improvisation research across domains	Framed improvisation as convergence of planning and execution under time pressure
(Yang & Lu, 2024)	Lean Planning under Uncertainty	Applied data-driven optimization to Lean planning	Extended Lean research toward adaptive and uncertainty-aware production systems

Existing Lean Construction research demonstrates that LPS provides a structured framework for collaborative planning under uncertainty. However, most studies focus on planning tools, outcomes, or individual capabilities rather than on interactional dynamics during planning sessions. Recent research acknowledges that improvisation, decision-making, and adaptation are necessary components of construction planning when predefined procedures are insufficient (Alhusseina et al., 2018). Organizational research further conceptualizes improvisation as the convergence of planning and execution under time pressure (Hadida et al., 2015). Many research studies demonstrated Improvements by improvisation, decision making, and other traditional models, but there is limited empirical research examining how creative problem-solving emerges through dialogue and interaction during LPS planning sessions. This study addresses this gap by examining creativity as an interaction-driven phenomenon within

collaborative planning by demonstrating survey response and actual reaction through sentiment and density dialogic creative indicator.

METHODOLOGY

Research Design: This study adopts an interpretive approach using qualitative and quantitative analysis to examine creative problem-solving behaviours during collaborative planning under uncertainty. Two complementary data sources were used: (1) post-session survey responses and (2) recorded LPS planning sessions.

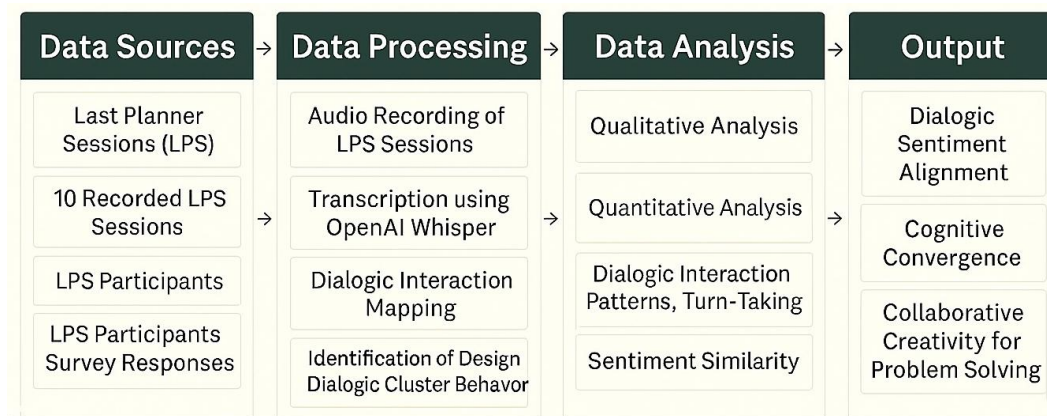


Figure 1: Integrated methodological Architecture

Data collection: Data were collected during ten **Look-Ahead** and **Pull Planning** sessions across four construction firms, representing commercial and infrastructure projects with budgets ranging \$4.4 million, \$42 million, \$64 million, and \$2 billion. Sessions lasted between 20 and 90 minutes and included project managers, engineers, superintendents, foremen, and trades. All sessions were audio-recorded using a dual-transmitter recording system to ensure clarity. These recordings captured real-time planning interactions in which participants identified constraints, negotiated solutions, and coordinated work.

The composition of each Last Planner System (LPS) session reflected the collaborative structure typical of Lean Construction planning. Every session included a mix of core planning roles, a general contractor or project manager acting as facilitator, several trade foremen responsible for specific scopes (mechanical, electrical, civil, structural, utilities, and finishes), and supporting engineers or schedulers providing design and constraint input. This ensures representation across all key trades engaged in daily or weekly production planning. The facilitator guided the conversation, maintained flow, and prompted trade partners to identify constraints, propose sequencing, and confirm commitments. The trade foremen and superintendents contributed operational knowledge, discussed field conditions, and made real-time adjustments to align work packages.

A total of ten LPS sessions were recorded and analyzed across four project groups (A–D), covering both Look-Ahead and Pull-Planning phases. Group A: AS1 (one session), Group B: BS1 (one session), Group C: CS1 – CS4 (four sessions – same participants), Group D: DS1 – DS4 (four sessions - same participants).



Figure 2: Last Planner sessions in construction projects

Data processing: All audio recordings from ten LPS planning sessions were transcribed into verbatim text using an AI-assisted pipeline. Speech-to-text transcription was first generated using Whisper AI and then refined using ChatGPT API Tokens to improve readability while preserving speaker turns and meaning.

Speaker diarization was applied to separate speech by participants Using Hugging Face Token (Bredin, 2021), enabling identification of who initiated ideas, how responses evolved, and how conversational leadership shifted. Python coding processing was additionally used to extract time-stamped interaction metrics (e.g., speaking frequency and duration) to support dialogic analysis across sessions.

The transcripts were then segmented into problem-solving episodes, defined as time-bounded interactions where participants addressed disruptions, constraints, or feasibility gaps in planned work. To capture the emotional tone of discussions, NVivo sentiment analysis was applied to coded dialogue segments using custom ChatGPT for NVivo. Speech segments were analyzed for emotional tone and classified into one of three polarity categories: Positive (values +0.1 to +1.0), Neutral (−0.1 to +0.1), Negative (−1.0 to −0.1). The overall polarity for each speaker was then used to contextualize their behavioral scores and scores were processed using Cosine similarity to identify similarity with the survey responses and sessional actual behavior. This approach treats sentiment as a quantitative indicator of emotional engagement and responsiveness during creative dialogue.

DATA ANALYSIS

Participants' Interview Responses and Sentiment Analysis from the Session (Quantitative):

The speakers listed in this section represent participants who completed the 19-question interview instrument designed to measure behaviour's Creativity, Motivation, Innovation, and Frustration (see Appendix -A for questionnaire). These measures are based on behaviour's exhibited during the live sessions. The interviews capture participants' self-perceived cognitive and emotional engagement, while the sentiment analysis evaluates actual behaviour (reaction) of participants during problem solving events.

Interview Response Vector (IV): The interview response vector captures participants' self-perceived engagement in creative problem-solving during the planning session. Median values from the post-session interview instrument were used to construct the vector across four problem-solving attributes:

$$IV = [\text{Creativity}, \text{Motivation}, \text{Innovation}, \text{Frustration}]$$

Behavioral Sentiment Vector (BV): The behavioral sentiment vector represents participants' expressed behavior during the LPS session. Speech segments were analyzed for emotional tone and sentiment polarity (positive, neutral, negative), and the resulting scores were mapped to the same four attributes:

$$BV = [\text{Creativity}, \text{Motivation}, \text{Innovation}, \text{Frustration}]$$

Using identical dimensions in both vectors ensures that the comparison reflects alignment across the same underlying problem-solving attributes.

Cosine Similarity: Cosine similarity was employed to quantify the degree of alignment between interview-based perceptions and observed behavioral expression. This metric measures the directional similarity between two vectors, allowing the analysis to focus on the relative pattern of emphasis across problem-solving attributes rather than absolute score magnitude.

The cosine similarity was calculated as:

$$\cos(\theta) = \frac{IV \cdot BV}{\|IV\| \|BV\|}$$

Values closer to 1.0 indicate stronger alignment between perceived and expressed creative problem-solving behavior based on the response and actual actions during the session. To demonstrate the analytical approach and interpretation of the interview and sentiment measures, detailed results are presented for one representative session (Group A). Given IGLC page limitations, detailed quantitative analysis is presented for one representative session (Group A), while dialogic interaction patterns are illustrated across six of the ten sessions; the remaining survey-based sentiment scores for Groups B, C, and D along with the remaining four dialogic sessions is presented in the Author's extended research publication (Creative improvisation in the Last Planner System: enhancing problem solving in construction and management (Khan, 2025)).

Group A Participants:

Table 2: Group A average interview responses

Speaker	Creativity (Median)	Motivation (Median)	Innovation (Median)	Frustration (Median)
S4 (SSI)	5.0	5.0	5.0	5.0
S3 (PM)	4.0	5.0	5.0	4.0
S6 (MEP)	4.0	5.0	5.0	4.0
S5 (PE)	4.0	4.0	4.0	4.0
S1(SI)	3.0	4.0	3.0	3.0

Table 3: Sentimental analysis of interview participants in group A session

Speaker	Polarity	Creativity	Motivation	Innovation	Frustration
S4 (SSI)	Positive	4	3	4	3
S3 (PM)	Positive	5	5	5	3
S6 (MEP)	Positive	3	4	4	2
S5 (PE)	Neutral	3	4	3	4
S1 (SI)	Positive	3	5	2	2

This calculation shows how sentiment alignment was measured for each participant, where interview medians and sentiment-coded behavioral scores were transformed into two comparable vectors using cosine similarity.

Example speaker – 4:

Interview Medians (IV): [5, 5, 5, 5]

Sentiment/Behavior Scores (BV): [4, 3, 4, 3]

IV·BV (Dot product):

$$(5 \times 4) + (5 \times 3) + (5 \times 4) + (5 \times 3) = 70$$

$$\text{Magnitudes: } \|IV\| = 10, \|BV\| = 7.07$$

$$\text{Cosine Similarity: } 70 / (10 \times 7.07) \approx 0.99$$

High Alignment (Strong creative Contributors) - Speakers 3, 4, and 5

High cosine similarity values ≈ 0.90 – 0.99 -Strong positive polarity

Moderate Alignment - Speaker 6

Cosine similarity ≈ 0.70 – 0.85 -Positive polarity but slightly lower motivation/innovation

Lower Alignment - Speaker 1Cosine similarity ≈ 0.55 – 0.65 -Neutral-to-positive polarity

Table 4: Summary of sentiment overview of groups A-D

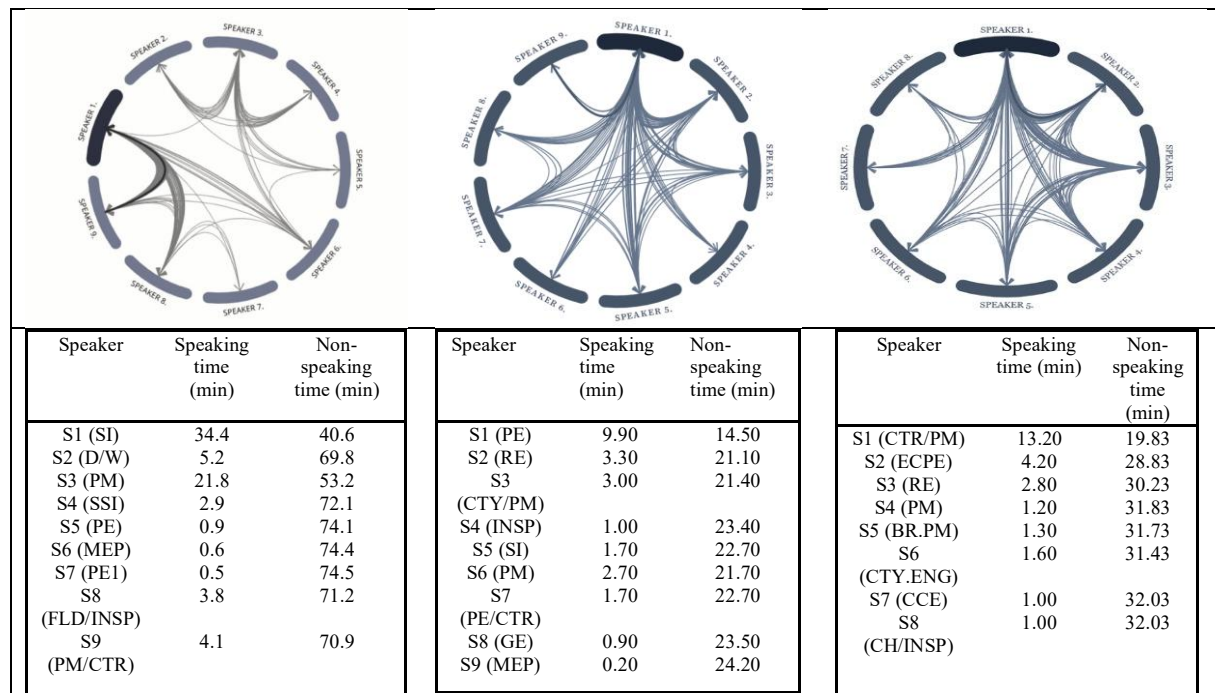
Group	Participants (n)	Cosine Similarity Range	Dominant Sentiment Polarity
A	5	0.55–0.99	Mostly Positive
B	3	0.87–0.96	Positive / Neutral
C	6	0.75–0.97	Positive (High) / Neutral (Moderate)
D	6	0.70–0.90	Positive / Neutral
All Groups (A–D)	20	> 0.85 consistently	Positive polarity dominant

Member interaction analysis (Qualitative) - dialogic (Groups A to D – Sessions AS1 to DS4):

Dialogic.live (Dialogic, 2024), is a conversational analytics platform used to visualize and real-time dialogue dynamics in group discussions. The software analyzes speech streams to identify who speaks, when, for how long, and in what sequence, generating time-based visualizations of interaction patterns. It focuses on interaction density, turn-taking structure, speaker balance, and conversational flow, rather than the semantic quality of ideas.

Using Dialogic.live, each of the ten recorded LPS sessions was transcribed, coded by speaker, and visualized as chord diagrams illustrating the direction, frequency, and density of communication exchanges among participants. The dialogic maps also capture speaking and non-speaking time, enabling identification of dominant contributors, intermittent participants, and peripheral actors.

These interaction patterns provide insight into the conditions under which creative problem-solving occurs, where intensified dialogue, responsiveness, overlap, and well-timed interventions are interpreted as forms of creative action (e.g., proposing solutions, clarifying constraints, or redirecting discussion).



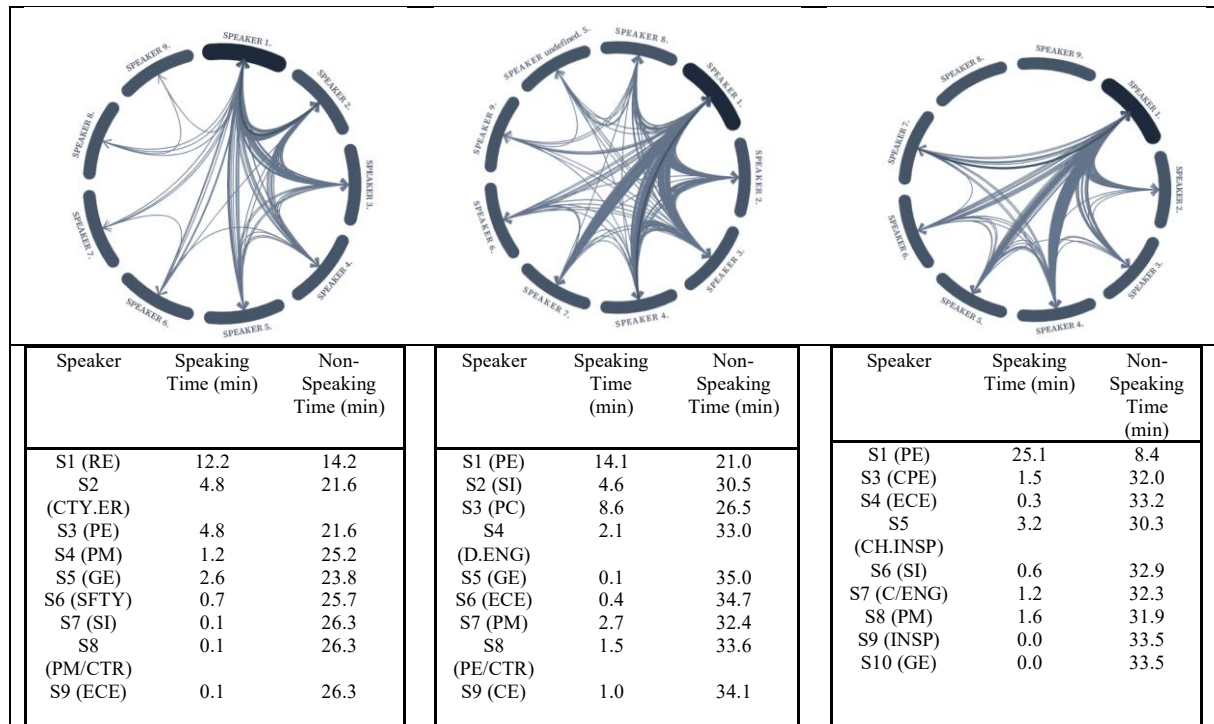


Figure 3: Dialogic interaction analysis sessions AS1, BS1, CS1, CS2, DS1, DS2

This study has utilized six LPS sessions for dialogic analysis out of the ten sessions due to the IGLC page limitations. And the list of all role activations from the figure 3 is shown in the appendix A. The dialogic diagrams exhibit noticeable variations in the shape, density, and orientation of interaction arcs, reflecting how different types of planning challenges influence the conversational dynamics of the group.

AS1 (wrong pipe installation + hanger delays): Interaction is strongly concentrated around S1 (Superintendent, 34.4 min) and S3 (Project Manager, 21.8 min), indicating a leadership-led correction cycle (problem framing → coordination → resequencing). Secondary contributors include S2 (Drywaller, 5.2 min) and S9 (PM/Contractor, 4.1 min), with smaller but supportive inputs from inspection/field roles.

BS1 (delay identifying dead spots for removals): The session is anchored by S1 (Project Engineer, 9.9 min), followed by S2 (Resident Engineer, 3.3 min) and S3 (City/PM, 3.0 min). The structure reflects technical-led clarification, with supporting coordination from S6 (PM, 2.7 min) and targeted field/contractor inputs (S5 SI, 1.7 min; S7 PE/CTR, 1.7 min).

CS1 (differential site condition): The core driver is S1 (Contractor/PM, 13.2 min), with secondary participation from S2 (ECPE, 4.2 min) and S3 (Resident Engineer, 2.8 min). Smaller but strategically placed contributions from City Engineer (S6, 1.6 min) and inspection/changes roles (S8 CH/INSP, 1.0; S7 CCE, 1.0) indicate constraint validation and decision support during the site-condition discussion.

CS2 (contractor error in knee wall footing): Creative correction is centered on the Resident Engineer S1 (12.2 min), supported by S2 (CTY.ER, 4.8 min) and S3 (Project Engineer, 4.8 min). Additional supporting roles (e.g., S5 GE, 2.6 min; S4 PM, 1.2 min) appear around the dense interaction cluster, consistent with a verification-and-correction cycle after an identified construction error.

DS1 (traffic lane closure delays): The dominant contributors are S1 (Project Engineer, 14.1 min) and S3 (PC, 8.6 min), with supporting coordination from S2 (Superintendent, 4.6 min) and S7 (PM, 2.7 min). The interaction pattern reflects operationally focused improvisation to resolve lane-closure constraints efficiently.

DS2 (water flooding at bridge + shoulder connection): The session is highly centralized around S1 (Project Engineer, 25.1 min), with secondary but important constraint-oriented contributions from S5 (Chief Inspector, 3.2 min) and smaller supporting inputs from S8 (PM, 1.6 min) and S7 (C/ENG, 1.2 min). This indicates expert-led diagnosis and correction under a high-impact field condition.

RESULTS

Results are presented for only one representative session (Group A) to demonstrate the analytical approach. Survey data indicated high median scores for creativity, motivation, and innovation among core participants. Sentiment analysis showed predominantly positive emotional tone during problem-solving episodes. The cosine similarity analysis reveals a clear pattern: participants who reported higher creativity, motivation, and innovation in the interview also demonstrated more positive sentiment and stronger behavioral engagement during the session. Speakers 3, 4, and 5 consistently demonstrated the highest alignment between their perceived and expressed creative capabilities, indicating a stronger readiness and willingness to contribute to real-time problem-solving. Lower alignment scores (e.g., Speaker 1) suggest that some participants may perceive themselves as capable contributors but express those behaviors less frequently during collaborative dialogue.

The dialogic diagrams exhibit noticeable variations in the shape, density, and orientation of interaction arcs, reflecting how different types of planning challenges influence the conversational dynamics of the group. These structural variations correspond to the nature of the problems being addressed and the degree of coordination required among participants. Across sessions, the highest-impact creative problem-solving consistently concentrates around roles responsible for coordination and technical actions, Superintendent/PM leadership in AS1, Project Engineer leadership in BS1/DS1/DS2, and Resident Engineer leadership in CS2. Importantly, several roles show high influence with lower speaking time (e.g., inspection, city engineering, changes coordination), indicating that creativity in LPS is not only “who talks most,” but also who intervenes at the right time to resolve constraints and move the plan forward.

Dialogic interaction analysis qualitatively reveals how creativity emerges during problem-solving in Last Planner System (LPS) planning sessions. Dense interaction clusters observed during constraint identification, sequencing, and corrective discussions indicate periods of intensified collaborative effort, where participants collectively negotiate uncertainty and adapt plans. In this study, dialogic concentration is interpreted as creative activity indicator, as it reflects coordination rather than routine information exchange.

The results also show that creative influence is not proportional to speaking time. Participants with limited verbal contribution often exert high impact through timely interventions that redirect discussion, validate constraints, or enable resolution, highlighting creativity as situational and interaction-dependent rather than individual or continuous.

DISCUSSION

The results indicate that creativity in LPS planning sessions emerges through interactional dynamics rather than isolated individual ideas. Interaction density in dialogic is not interpreted as a direct measure of creativity, but as an indicator of intensified collaborative engagement during problem-solving discussions in LPS planning sessions. Creative problem-solving in collaborative planning environments typically unfolds through interaction sequences where participants identify constraints, propose alternatives, negotiate feasibility, and align decisions about planned work. Periods of dense dialogue therefore often correspond to moments when these creative problem-solving dynamics become visible in the conversation, such as problem

recognition, proposal of solutions, and collective evaluation of alternatives. For this reason, interaction density is interpreted as a contextual signal of active problem-solving dynamics of creativity. Participants with higher creative engagement demonstrated stronger interactional presence, reinforcing the role of dialogue and timing in collaborative problem-solving. The findings suggest that facilitation strategies supporting open communication and shared constraint understanding can enhance creative engagement in Lean planning.

Cosine similarity analysis of sentiment and survey responses indicates higher emotional and cognitive alignment among participants during periods of dense dialogic interaction. This alignment suggests that shared understanding and coordinated problem framing are grounded in observable interaction dynamics. Participants with higher creative engagement demonstrated stronger interactional presence, reinforcing the role of dialogue and timing in collaborative problem-solving.

Within this context, cognitive convergence is understood as convergent thinking, defined as a style of thinking that allows finding a single solution a well-defined problem, which requires more persistence and focus (Zhang et al., 2020). In this study, cognitive convergence is not treated as an individual cognitive trait, but as a collective process that emerges through dialogic interaction. Periods of dense dialogic exchange reflect moments where participants align problem frames, validate constraints, and coordinate responses, creating conditions under which convergent thinking can occur at the group level.

By capturing both participant level patterns of sentiments and interactional processes, this study provides a multi-dimensional account of how creativity enacted in practice. These implications align with the paper's broader argument that "creativity is understood as enacted through responsive exchanges among participants, enabling adaptive planning while maintaining alignment with production requirements and workflow reliability." Strengthening the interactional conditions for such exchanges becomes a key lever for improving planning under uncertainty.

Future research could expand the empirical scope by comparing LPS sessions across infrastructure vs. building projects and different delivery methods such as design-bid-build, design-build, and IPD. Such comparisons would help clarify how interactional patterns of creativity differ depending on project scale, complexity, and contractual arrangements. This would reveal how organizational and regulatory contexts shape who contributes creative ideas, and how these emerge during planning discussions.

CONCLUSION

This paper argues that creativity in construction planning is best understood as an interaction-driven process embedded within Last Planner System (LPS) sessions, rather than as an unstructured or externally imported concept. Through analysis of recorded planning meetings and practitioners' perspectives, the study shows how teams respond adaptively to emerging constraints through real-time communication. Creative solutions are initiated, negotiated, and refined collectively, not produced by isolated individuals through dialogue exchange. The findings frame creativity as a disciplined, collaborative capability operating within safety, engineering, and production boundaries. LPS provides the structural foundations of planning, while interaction supplies the creative energy that keeps plans aligned with changing conditions. Deliberately cultivating these interactional processes can strengthen collaborative planning and sustain reliable production under uncertainty.

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APPENDIX-A

Role Abbreviations: PE → Project Engineer, RE → Resident Engineer, PM → Project Manager, D/W → Dry Waller, SI → Superintendent, MEP → Mechanical, Electrical, Plumbing, GE → Graduate Engineer, CE → City Engineer, ECE → Erosion Control Engineer, PE/CTR → Project Engineer / Contractor, PM/CTR → Project Manager / Contractor, CH/INSP → Chief Inspector, CE → Concrete Engineering, EPC/ENG → Engineering Project Coordinator / Engineer, EPC/PM → Engineering Project Coordinator / Project Manager, NSP → Inspector, CCE → Central Changes Engineer.

Table 4: Interview questions

Creativity	Motivation
Please rate 1-5 each question based on your experience /insights 1. I create ideas to solve planning constraints or planning issues among trades that participate in the pull planning sessions 2. Creative thinking helps me adapt and solve problems when planning or adjusting schedules. 3. I actively seek creative or new solutions when adjustments are needed during pull planning sessions. 4. My approach to unplanned issues changes depending on the situation. 5. My ability to think creatively during pull planning transfers to other on-site work. 6. I generate ideas to Improve and innovate solutions for solving problem in pull planning sessions. · Never true of me =1 · Sometimes true of me =2 · Often true of me =3 · Almost always true of me =4 · Always true of me =5	Please rate 1-5 each question based on your experience /insights 1. I want my participation in Pull Planning tasks to offer me opportunities to increase my knowledge and skills. 2. When participating in a pull plan, I prefer to do tasks that I know well over those that stretch my abilities. 3. I feel more confident when I have a say in setting deadlines and constraints to reach goals. 4. I feel motivated to solve problems when I am involved in pull planning tasks. 5. I enjoy solving problems and removing obstacles by making necessary adjustments during pull planning. · Never true of me =1 · Sometimes true of me =2 · Often true of me =3 · Almost always true of me =4 · Always true of me =5
Innovation	Frustration
Please rate 1-5 each question based on your experience /insights 1. I implement my ideas with great persistence in pull planning sessions. 2. I consistently think about continuous improvement with other trades in pull planning sessions. 3. Trades bring innovative solutions by generating new adjustments to improve processes when addressing uncertainties during pull planning tasks. 4. In collaboration with trades during pull planning sessions, I suggest innovative ideas to improve workflow efficiency. · Never true of me =1 · Sometimes true of me =2 · Often true of me =3 · Almost always true of me =4 · Always true of me =5	Please rate 1-5 each question based on your experience /insights 1. I adapt outside the original plan when needed during planning sessions. 2. Problem-solving is necessary when frequently encountered issues require plan adjustments. 3. My approach to unplanned issues has remained the same as when I initially learned to address them. 4. I believe skills for addressing unplanned issues must be taught and developed over time. · Never true of me =1 · Sometimes true of me =2 · Often true of me =3 · Almost always true of me =4 · Always true of me =5