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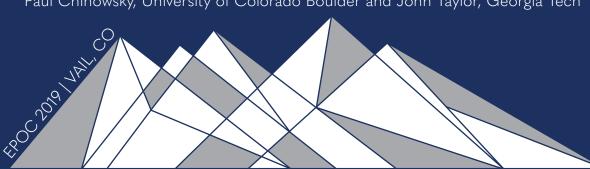Conference

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Narrative Infrastructure in Decision-Making: How Teams Use Stories and Sensemaking for Strategy

Laura Osburn; University of Washington, USA
Gina Neff; University of Oxford, UK
Carrie Dossick; University of Washington, USA
Chris Monson; University of Washington, USA
Heather Burpee; University of Washington, USA

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Authors

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Summary of the work

In this article we compare how two multi-disciplinary, inter-organizational teams construct narratives that shape pathways for the team's decisions about strategy. Research to date on narratives in organizations shows how people use stories for sensemaking in ambiguous situations and how they co-construct and negotiate around stories through this process. However, many of these studies analyze teams' narratives retrospectively. This article responds to calls for more ethnographic empirical research detailing *in vivo* the process of narrative construction to support collective sensemaking and sense-giving, mitigate tensions, and direct external and internal decision-making. This paper presents qualitative participant observation data from two energy design teams on hospital building projects. Both teams used stories in attempts to anticipate client needs and desires through the lens of their own expertise and agendas. Once in place, these stories formed "narrative infrastructures" that shaped the team's decision-making. Teams settled on stories about the nature of the project or clients' agendas that bridged the diverse goals and needs of the team members with those of their clients.

Relationship to the Grand Challenges

This work speaks primarily two grand challenges: 1) the New Project Manager and 2) Systems Integration. First, in terms of the New Project manager, this work on narratives points to what managers need to be aware of and how they can establish shared goals and priorities across a

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team. Leaders can use narratives to create focus on a project and a shared sense of purpose. If unaware of this phenomenon however, project managers may find their teams struggling with conflicts or conflicting narratives that work against team cohesion. Second, in the systems integration challenge, multidisciplinary teams need to come together to solve complex interrelated problems. The work on narrative provides clues as to develop team formation and management work processes that bring desperate disciplines together around a shared problem. Narratives exist in groups whether we intentionally shape them or not, and this work provide insight into how these narratives play out in engineering project teams and provides insight into how to leverage narratives for integrated team performance.

Summary of Results to be Presented

In this presentation we will focus on the contributions of this research. In this work we found that narratives worked as strategic infrastructure when they shaped future iterations of collective sensemaking and decision-making as new stories about the project emerged. Once in place, these infrastructures were hard to change as they are extended and protected by the team. Narratives and the stories that form these infrastructures leverage specific team priorities and shape strategies for decision-making, future sensemaking, and sense-giving among the team and with the client as the project—and story of the project—evolves over time.

Keywords

Narrative, sensemaking, decision-making, storytelling, engineering teams, social interaction, collaboration

Introduction

Inter-organizational, multi-disciplinary, project-based teams use narrative construction processes to shape strategies for decision-making. Through stories, team members negotiate the meaning behind ambiguous events and information and strategize narrative performances that frame decision-making in the future.

Despite the fact that processes of making and circulating stories are inherently interactive, much of the literature on narrative and strategy has tended to rely on retrospective interview data rather than *in vivo* data collection (Fenton & Langley, 2011) or has focused on the narratives themselves instead of the process of constructing them (Abolafia, 2010). Theory and empirical research on *narrative infrastructures* (Bartel & Garud, 2009; Deuten & Rip, 2000; Golant & Sillince, 2007; Llewellyn, 2001)—the narrative scaffolding that directs action and change in organizations—also relies on retrospective data collection, missing the interactive and negotiated "story performances" (Boje, 1991) of teams that lead to the construction and maintenance narratives that can direct actions. To see how narratives unfold and shape team decision-making, researchers must use methods that capture storytelling as it occurs (Fenton and Langley, 2011).

This article uses ethnographic data about two hospital design teams to show how the process of narrative construction shapes teams' strategies for decision-making. This process contributes to shared understanding across the team for which decisions will bridge conflicting internal and external priorities. This article interprets the narrative process of two teams as a series of performances and negotiations that develop organically through team members' reflection about the past and anticipation about the future. Once a narrative emerges from these negotiated and performative interactions, becomes "narrative infrastructure" (Deuten & Rip, 2000; Llewellyn, 2001) that shapes decision-making, sensemaking, and sense-giving in the team. In our cases,

narrative infrastructures shaped the teams' strategies around what designs to provide to a client. Teams can build resilience into the narrative infrastructure when their narratives face an external threat, as happened on one of our cases. This suggests that narrative infrastructures not only shape strategy, but are tricky to change once teams established them.

The setting of hospital design provided our research team with sites for interdisciplinary and inter-organizational team interactions as both project teams were challenged to make sense of the hospital's priorities for a new building project. For this study, we focus on narratives about energy efficiency as we analyzed engineers' and architects' stories about owners[1] and their energy goals for two hospital building projects. We use ethnographic vignettes (Miles & Huberman, 1994) to demonstrate how stories about owners are negotiated and performed in design teams as a part of sensemaking around ambiguous owner goals and expectations: a process where teams interpret stories as "hints" about the owner through the lens of team member expertise and their specific organizational and disciplinary goals. Through these sensemaking processes, teams redefine and refine owner goals, bridging team member and client priorities, and develop shared understanding around a project narrative that shapes design options and presentation strategies for owner decision-making. In this sense, the stories teams tell help them to develop strategic, but malleable, narrative infrastructure that shapes how they in turn perform project narratives for their client. Narrative infrastructure develops its own momentum that shapes how team members make sense of new stories and respond to external threats that emerge throughout the duration of the project.

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[1] The term, owners, is common in the building industry and acts as a stand in for a variety of client representatives: building employees and owner-hired consultants that officially represent the hospital and are appointed to either make decisions on behalf of the hospital, or bring project decisions to a hospital's board of directors. We use the terms client and owner interchangeably in this article.

Below we present the conceptual framework for this study. Next we discuss methods followed with a description of the energy design context. We then use two ethnographic vignettes from our observation of hospital building projects to show the process of constructing narrative infrastructures. We compare how the narrative construction processes involve sensemaking and storytelling activities that mitigate organizational and disciplinary tensions. These narrative construction processes produce strategic narrative infrastructures that shape how teams set pathways for future decision-making and sensemaking as the project—and story of the project— evolves over time. We then conclude with suggestions about the importance of these processes— and of the time and space for these processes—for project-based teams more generally.

Narrative Construction as Process and Strategy

Several distinctions should be made in the way we use the term narrative. First we diverge from Czarniawska's definition of story as an "emplotted narrative" and narrative as a chronological account (Czarniawska-Joerges, 2004). Instead we use Boje's (2001) definition of story as a retelling of an incident or events and narrative as the addition of "plot and coherence." The term narrative process (or narrative construction process) indicates an action or an activity where stories are created, debated, and invoked over time (Abolafia, 2010).

Organizational research has often focused on the social and communication processes of sensemaking and sense-giving in the production and exchange of narratives. Sensemaking is a subjective, retrospective, social activity that attempts to give meaning to ambiguous or equivocal events (Brown, Colville, & Pye, 2015; Weick, 1995). Sensemaking can involve the use of non-structural small stories (Bamberg & Georgakopoulou, 2008; de Fina & Georgakopoulou, 2008; Georgakopoulou, 2007) or antenarratives (Boje, 1991): fragmented, unplotted, and incoherent stories told or performed in conversation that are both a "speculation and a bet" (Boje, 1991).

These storytelling practices are polyphonic, embedded in community practice (Georgakopoulou, 2008), and can be used to negotiate the meaning of a story through "glossing" (Boje, 1991) that will shift or exaggerate meaning in new ways.

While sensemaking is about "making sense" of ambiguities, *sense-giving* is about conveying the meaning of a story for an audience. In sense-giving, fragmented stories help people co-construct meaning through discontinuity, tensions and editing (Humle & Pedersen, 2015). In these fragmented stories, storytellers use "slippages," "gaps," and "linkages" to modify or emphasize a part of a story (Humle & Pedersen, 2015). Sense-giving, like sensemaking, is also situated and dependent upon the relationship between the storyteller and audience. Storytellers interact with listeners' "paralinguistic and kinesic cues" during their performances, reacting to these cues to shift the way they tell their story for the greatest affect (Greatbatch & Clark, 2010).

Narratives provide researchers insights into the dynamics between individual and group processes. For example, Abolofia's (2010) work investigated macro pressures on individual sensemaking and their impact on collaborative policy decision-making. Different styles of storytelling, such as structural narratives and unstructured stories, can co-exist in groups and are employed for different reasons, such as creating order or disorder (Pedersen & Johansen, 2012). A community's narratives can also be transformed when a story does not "fit" the expectations of participants, showing that narratives can carry their own set of affordances and constraints in relation to the sociotechnical context (Millerand, Ribes, Baker, & Bowker, 2013). Likewise, Law's (1994) theory of narratives as "modes of ordering" and Doolin's (2003) empirical analysis of "clinical leadership" narratives suggest that narratives have discursive, social, and material dimensions that structure organizational relations and can reinforce specific social orders.

Therefore, narratives are often viewed as an essential part of the strategizing processes for group and individuals.

Narratives become infrastructure for decision-making when they gain agency during the narrative construction process. Narrative infrastructure is defined as "the evolving aggregation of actors/ narratives in their material and social settings that enables and constrains the possible stories, actions and interactions by actors. It can be seen as the 'rails' along which multi-actor and multi-level processes gain thrust and direction" (Deuten & Rip, 2000, p. 74). Narrative infrastructures provide the scaffolding from which action and change can be directed. In this sense, agency comes through the multi-actor, ongoing processes of narrative construction and narrative linking.

While narrative infrastructure is a process of building and shaping social meaning, most researchers have studied its construction retrospectively through interviews and document analysis (Bartel & Garud, 2009; Deuten & Rip, 2000; Golant & Sillince, 2007; Llewellyn, 2001). The interactive and negotiated "story performances" (Boje, 1991) of teams as they occur in specific contexts around strategy and decision-making are missed, even as researchers (including Deuten & Rip, 2000) acknowledge the problems with retrospective methods. While narratives are defined as "constitutive of action" (Fenton & Langley, 2011), little research demonstrates how this process occurs through the negotiated interactions that carry out sensemaking and sense-giving—processes that strategically manage the diverse priorities and goals inherent to inter-organizational communities engaged in collaboration. Interviews provide us with memories of narratives held within the minds of single participants. In-the-moment observation, though, can capture the on-going process of narrative co-construction as teams remember, share, and negotiate stories and events.

Ethnographic methods can capture and illuminate how these processes occur in strategic praxis (Fenton & Langley, 2011; Whittington, 2006), illustrating how conversations, talk, and interactions produce narratives that enable and constrain the decision-making environment. Fenton and Langley (2011) challenged scholars to understand the "fragmented, partial, and multi-level" (p. 1178) nature of storytelling and narrative in organizations, a challenge we take up here. This helps us observe how the narrative construction processes builds a strategic infrastructure for teams that shapes their strategies for decision-making over time.

Method

This article relies on data collected as part of a three-year study on how architecture, engineering and construction (AEC) design teams translate and synthesize the results of energy modeling data in architectural and engineering design decision-making. The project's larger dataset consists of 20 interviews of expert energy design consultants across the U.S. and over 30 interviews with participants on eight hospital case studies. Our fieldwork involved 313 hours of observations of energy design teams at work, following energy modelers from three different firms working on 18 building projects and 12 interviews with participants on those teams. These data comprise over 297,000 words of written field notes. Our data also consist of over 80 artifacts consisting of meeting agendas, photographs, PowerPoint presentations to teams and building owners, energy reports, floorplans and site plans, meeting handouts, spreadsheet presentations, spreadsheet tools for data collection and calculations, and team memos.

For this article, we analyzed data from two key cases—different energy design teams for two different hospital construction projects with different types of energy modelers. One energy modeler worked for his own independent engineering and energy-focused design firm. The second worked within a larger mechanical engineering firm. We conducted extensive field

observations of these two modelers and observed how the design teams they were a part of shared stories. Our research team was focused on how the design team communicated energy modeling information to the hospitals' owners. What emerged during our observations was the key importance of the project narratives that the teams (and owners) jointly constructed.

After data collection, we set boundaries around which stories to choose for this analysis. This was crucial as multiple stories were shared amongst the design team about owners, other key team members, and the project itself. In order to follow the path from "storytelling as team practice" to a "team-developed narrative about a project's energy goals," we focused on stories told amongst the team about the owners and their goals for a project. We call these "owner stories" and show how they set expectations about the goals of the project's energy design and established disciplinary constraints (e.g., budget, architectural, site) the team needed to work with to achieve the hospital design. Other stories were identified in our field notes as a part of this particular dataset when they related to how the team worked to find meaning in stories about the owner or contended with owner stories that threatened to alter an already established and evolving project narrative.

After identifying the cases and stories for this paper, we developed in-case matrices (Miles & Huberman, 1994). These matrices identified the range of stories about owners, the storyteller, the audience, intersections between two or more stories, and why these stories were told or invoked. Finally, we wrote two qualitative vignettes identifying key stories about owners, the context of the storyteller, and how the storyteller's organizational and disciplinary goals and needs were embedded in these stories.

The Energy Design Team Context

Teams of architects and engineers work together at the beginning of a project's conceptual or schematic design to help building owners set energy goals, a process called energy design. The goals set for a project in energy design could be to reduce energy use by a certain percent, reach a particular Energy Use Index (EUI) target, or meet the standards of particular agreements or challenges, for example LEED Platinum or the Architecture 2030 Challenge. Energy design teams develop building system strategies to achieve those goals, test those strategies through computer simulations called energy modeling, and then translate energy model results and design options back to the larger architectural and engineering design team and the owner. During this period of translation, the team uses strategic communication practices to make the energy model results and design options meaningful to owners. This usually occurs through disseminating an "energy report" or a "design narrative" document that outlines options for energy design, mechanical systems, and architectural opportunities.

The conflicting obligations and aspirations of the multiple organizations and stakeholders working on buildings shape energy design teams and their practices. These conflicting obligations consists of macro-level firm and micro-level professional needs and goals [AUTHOR CITE]. For example, an energy modeler we observed often commented on his own dedication to pushing owners and project teams toward more aggressive energy efficient strategies, while noting that mechanical engineers could be more conservative in their energy modeling assumptions because they could be professionally liable if a design fails. In the following ethnography, we show how conflicting obligations and aspirations of team members and key tensions, particularly between client and team, intersect with storytelling processes and the evolving narrative construction on two hospital projects.

The Performance and Negotiation of the Narrative Construction Process

We followed the narrative construction process for different energy design teams on two hospital projects during the schematic design phase. Both projects involved a team of architects, engineers, and energy modelers who interacted with and shared stories about the hospital's owners. Each vignette below begins with the team in negotiated sensemaking using fractured stories about the owner in order to anticipate the owner's expectations and goals for the project. In each story told in the team, the engineering expertise and individual professional or firm-related goals shaped the sensemaking practices that surfaced. Through these sensemaking practices, teams defined or refined the owners' goals to align them with the priorities of other members of the energy team, literally interpreting these stories in ways to fit with the multiple goals and needs in play. This begins the process of developing project narratives that would shape the design choices and future sense-giving around the goals of the both projects. As the teams negotiated how to strategically communicate decision options to the owner, they integrated their teamwork and collaboration into the narrative construction process. The end of this narrative construction process was the moment when the team performed this narrative to the owner to engage in sense-giving around specific design decisions.

The team in the second case we present faced an external threat to their project narrative: an owner's counternarrative that threatened the team's project goals. When the team discovered that their initial narrative about the project did not fit the owner's expectations, they organized around their narrative and tried to protect and extend it to make it more resilient to "attack." The result was a narrative infrastructure that was difficult for the team and owner to change, even with multiple iterations of sensemaking and negotiation. This team's experience demonstrate

how stories shape team perceptions around the narrative for the project, which in turn shapes how they develop strategies and make decisions to maintain that narrative when under threat.

Banner Creek Medical Center

The first team worked on a project we call Banner Creek Medical Center, a new tower construction and partial basement renovation on a large medical campus. The architecture firm hired energy consultants Richard and Alison to help with energy goal development and to model and consult on the energy impacts of architectural and mechanical system options. Richard and Alison then were tasked to help the design team and owner make energy design decisions based on the building's predicted energy use and financial implications, such as energy savings and energy bill costs. Other team members closely involved in this process were Warren, the architecture firm's sustainability leader; an architect project manager; and a contracted mechanical engineer. On the owner team was Bill, a key decision-maker, and other facilities management personnel from the hospital.

The team's narrative construction process began with initial meetings between the project team and the owner team to make sense of the desired energy goals for the hospital. Richard and Alison's first encounter with Bill was filled with confusion and ambiguity around the owner's priorities. During an architect-led "sustainability charrette," Warren started to take Bill and the rest of the owner team through an exercise about building system selection, when Bill became highly agitated. Bill abruptly told the group that he did not want to decide on system options until he had made a decision about the building's skin, which undermined the more holistic approach the design team prepared for the day. When the architects and energy consultants noted that this exercise would help the team clarify Banner Creek's energy goals, Bill loudly responded, "There is no top! Any goal. Go net zero."

What net zero meant for the client and the project became a key element for the project narrative they would later construct. Net zero typically refers to a building that consumes, on net over the course of a year, an amount of energy equal to the renewable energy created on the building site. While another owner representative had murmured that net zero was "unrealistic" for this particular building and Warren, the architect, tried to reorient Bill again to the importance of the building system exercise, Bill became increasingly agitated and asserted his net zero energy goal. The design team attempted to gather more information about what Bill meant:

> Bill: "We want an energy modeler team focused on zero waste of energy…"

> Warren: "What is your interest on ROI?[2] Help us to know what budget we can work within."

> Bill: "We're not there yet. We need a few weeks."

> Banner Creek facilities personnel, suggesting several low ROIs to the team: "1 month is excellent. 2 year ROI is a no-brainer. 10 years is less desirable and requires looking at what is the capital costs and overall costs."

> Warren, looking very tense: "So I am hearing, set a goal and work as hard as we can to do that?"

> Bill: "Net zero. Is it not achievable?"

> Warren, laughing: "It would take a long time. We could retire happy."

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[2] ROI: Return on Investment. For energy design, experts often calculate the cost of investment balanced against the annual savings from utility bills.

After the meeting ended and for several days that followed, Alison and Richard began engaging in negotiated sensemaking to try to determine what Bill had meant by net zero, as this did not seem to fit their expectations for this particular project nor did it seem like a realistic technical goal. They exchanged fractured stories about Bill's dialogue in the meeting, attempting to understand the event and what it implied for their work. During these exchanges, Richard would often refer to phrases Bill had made in the charrette as "hints" about Bill's meaning. Through their negotiated sensemaking about the ambiguous meaning of Bill's use of "net zero," they redefined Bill's net zero goal to mean that the energy bills of the entire hospital campus would not change after the new construction and renovation were completed. Richard began to call this energy goal, "Bill's definition of net zero." This new definition also reflected Richard's own goals for his company, saying after the charrette that he was excited to get his "foot in the door" for future work at this hospital.

While Bill and Alison had an emerging early project narrative centered on their meaning of "net zero," negotiated sensemaking would still continue between the energy designers and the rest of the project team. A week later, Richard and Alison received an email from the architect, Warren, retelling the story of the meeting and asserting his alternative interpretation of Bill's goal. Richard remarked to Alison that Warren's definition was technically unrealistic and that he wanted to provide Warren a realistic goal that aligned with the owner's own goal. Here, Richard's engineering expertise impacted what he believed would be the best way to make sense of—and to give sense to—Bill's statement of a net zero goal.

This negotiated sensemaking process finally concluded when Richard and Alison held a meeting with Warren at the architecture firm. They continued talking about the charrette, negotiating how to interpret the meaning Bill's energy goal into a strategy for developing energy design options.

Even though they had all been there, the team had two very different interpretations of what happened at the charrette. Warren interpreted Bill's goal to be a zero increase in the hospital's energy bills given the current scope and rough budget of the project. Warren warned Richard about the potential perils and problems of Richard's interpretation of what Bill meant by "net zero." Warrant thought Bill would be wary of any design options that included "out of scope" work, i.e., proposals for systems that were not in the original conception of the project. Richard and Alison, on the other hand, interpreted the story as meaning that they *should* propose out of scope work, something technically achievable to prevent an increase in overall energy bills.

As a result of this negotiated sensemaking, the team laid the foundations for the project's narrative. This project narrative would shape and constrain their work and the project's design options. After debate, the team eventually dubbed the project as having a *zero net* goal, adopting a neologism for Richard's interpretation of Bill's goal as a zero net increase in the hospital's energy bills. This articulation of the goal provided the foundation of the project's narrative. All strategies then had to align to a story of how the hospital and team could achieve "zero net." The consultants developed an energy modeling strategy that would provide three energy design options of increasing energy efficiency. The final option included additional out-of-scope work that would "zero out" utility bill increases on the hospital campus. This final option achieved the trajectory of the project narrative. The team would then compare the energy use and financial savings for each option, which set up a comparison which only the third option could achieve, the "zero net" goal.

Almost five months passed as the energy consultants worked on the energy model and developed a final report, or "memo," for the owner on their energy design. Over this time in the narrative construction process, the team's "zero net" narrative discussions centered on how to best give

sense to the owner about their design choices, shaping their presentation strategies. Warren developed a bar graph to compliment the memo to visually compare all three options, indicating how out-of-scope work was *required* to achieve the owner's goal. Both memo and graphic evolved out of several meetings of team negotiation and deliberation around the best way to give sense to the owner. These meetings were punctuated with ongoing stories that had emerged about different team member's knowledge or experiences with the owner, including the hospital's known aversion to new out-of-scope work. These stories were shared because they could impact the owner's reception of the team's narrative performance.

These stories became integrated into the project's narrative infrastructure and further constrained decisions about building systems. The design team kept circulating stories about the hospital's— and Bill's—dislike of what the team referred to as "scope creep," which suggested that the "zero net" option could be controversial for the owner. The mechanical engineer recalled stories about his own previous work with Bill that corroborated the narrative of Bill's aversion to "cost creep." To the energy consultants, these shared stories signified that they should perform the "zero net" narrative carefully for the owner so that their recommendations for out of scope work would be seen as a response to the owner's priorities.

The final performance of the narrative for the owner skillfully linked the owner's priorities to the team's redefined "zero net" energy goal. When the architect project manager and Richard met with Bill to present their design options, Richard began by reminding Bill about their sustainability charrette and how the team processed the event.

> Richard: After the charrette we began to understand net zero energy as don't let
> the energy bill increase. Took that to heart and it became a question to answer.
> Next, what are the boundaries of the project?. . . Then what parts of the project

could we factor into the conversation?. . . If it doesn't get to zero, then which additional ideas could be on your list of things to address to give us realistic achievements and can we achieve those to achieve goals. . . . We characterize these in three buckets [categories]…They are put in buckets because they have cross-campus implications that need to be considered.

Richard's performance recalled the charrette event for the owner, how the team interpreted the owner's goal, and how this led to their development of their designs. Richard explicitly linked the owner's priorities to their recommendation for out-of-scope work. His retelling of the story of the project's events, team thinking, and design options, was intended to show that Bill's expectations were heard, interpreted, and successfully met. The team considered Richard's presentation a "success." The project's narrative infrastructure remained intact and would go on to shape future team sensemaking and sense-giving on the next design decisions for the project.

In Banner Creek, the energy designers, architect, and engineers engaged in a narrative construction process that consisted of iterations of story meaning-making that resulted in the production and maintenance of a project narrative for the team. Sensemaking and sense-giving activities during the narrative construction process not only allowed the team to negotiate the meaning of stories through the lens of their own organizational and disciplinary priorities, but ensured that these priorities were embedded in the narrative itself. As the narrative took shape and developed, further stories were recalled and integrated into the narrative of the project that acted as infrastructure to guide strategic decisions, such as how to best present design options to the owner. Here teams created narratives through making sense of stories together, developing a shared understanding of the larger narrative and purpose of a project, which became the

infrastructure that directed team pathways for their work, design decisions, and strategies for presentation.

Thomas J. Gambrill Health Center

The second team worked on the energy design for a new tower project we call Thomas J. Gambrill Health Center (or T.J. Gambrill). The energy design team on T. J. Gambrill consisted of representatives from an architecture firm and ENCOM, a mechanical engineering firm. The architects on the team included Geoff, the sustainability specialist, and a project manager. The two mechanical engineers on the team were Martin, a lead energy designer and expert in energy modeling, and Allen, the lead mechanical engineer. Unlike Banner Creek, this team's energy modeler was staffed within the mechanical engineering firm.

Just as with Banner Creek, this energy design team's narrative construction process began with the same initial sensemaking around the ambiguous energy goals of the hospital's owner. The owner's Request for Proposals (RFP)[3] had stated that the project's goal was to achieve something "very high performing." For the energy design team, "very high performing" could have multiple interpretations and could represent different values of concern for their client. The engineers and architects wondered aloud together whether the desire for "high performing" was due to financial concerns, cultural values about the environment, or "something else." As a result of this shared sensemaking, the team decided that "high performing" meant developing a set of three increasingly aggressive energy goals represented as numerical Energy Use Index (EUI) targets. Thus, the potential design pathways the project could take had to achieve either 110 EUI, 80 EUI, or 65 EUI, the highest performance goal. This early sensemaking provided the

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[3] RFP: Request for Proposals. A document sent out to architects and contractors to elicit quotes or bids on a contract. The document often provides client information as well as a detailed summary of the work being requested.

foundations for the project's narrative: a prospective story of what the project could be based on their expertise, interest in achieving an aggressive energy goal, and their collective interpretation of the owner's vague documented statement. After this meeting, the project narrative continued to emerge and evolve, shaping the energy modeling work and the selected systems that would make up the three energy design options for the building.

While the project's narrative had formed and was shaping the team's work, a threat to the team's narrative emerged. A new consultant had been added to the owner team to help guide their design decision-making. When the new consultant met with the ENCOM engineers, he announced that the hospital's goal was to use the cheapest—and low performing—systems for the building, particularly gas powered systems. The announcement left the ENCOM engineers "cringing." This counternarrative was not only a clear threat to the energy design team's current work on the project, it also did not align with the engineers' professional goals. The owner and ENCOM now had clearly conflicting organizational priorities and competing narratives about what the project was intended to be.

After this external threat appeared, the energy team rallied together to strategize how to protect and build resiliency into their project's narrative in preparation for a meeting with the owner team. This meeting would decide whether the owner agreed to move forward with the team's current energy designs. One of the strategies to protect the narrative was already being carried out in the documentation of their work. For example, in specific sections of ENCOM's Mechanical and Plumbing report for the hospital that had recently submitted to the owners, the report described how the architecture firm, contractor firm, ENCOM, and the owner team had *collaborated together* to set "progressive and challenging energy goals for the hospital." In a later section of the report, the engineers also provided a fractured story that indicated that the

ENCOM team held discussions around gas-powered systems, but decided that they were a poor choice for the project and would not be pursued by the team unless directed by the owner. Here, the team had already attempted to use story to align their work with the owner's needs and to defend their decisions around their energy designs.

Other strategies to build narrative resilience included instigating new events with other stakeholders that the energy design team could fashion into new stories. Here, the team's narrative infrastructure of the project begins shaping decisions around the types of stories the team will need to add to and protect the narrative. For example, during one meeting between ENCOM and the architecture team, Geoff suggested that Martin confirm electric rates with the local utility company and discuss potential utility incentives, hoping to assign financial values to their design options that would frame them as a financially worthwhile investment for the owner. Two days later, Martin set up a conference call with Geoff and two utility representatives from the local electric utility. During this call, Martin told a fractured version of the story about ENCOM's meeting with the owner consultant to persuade the utility to consider maximizing the possible incentive amount. This story provided the utility company with "hints" about the owner's new financial motivations and guided the utility representatives to consider providing the largest incentive possible.

> The first utility representative: "There is the question of the baseline…from a rebate strategy perspective, if the [baseline] option exceeds code then you are leaving the savings on the table that can't be incentivized." …
>
> Martin: "So would you recommend [a specific low performing system]…?"
>
> The second utility representative: "Our definition of baseline is code or standard practice. If strict code baselines is something never constructed, then it is not applicable. It is important to define a standard baseline."

Martin: "It might not be an unrealistic baseline. [these] units was presented by the contractor at an earlier meeting."

The first utility representative: "[This is] good news in terms of incentives into the financial structures. So it is good to know their [the owners'] financial perspective."

Next, Martin and Geoff engaged the utility representatives further to produce more content for his story that he could then add to the project's narrative infrastructure. Martin first asked the utility representatives about their opinions on his forecasted costs for electricity and requested that the utility review his own calculations for accuracy, noting that many of the numbers he used for his calculations came from the utility company's own official reports. The utility representative responded that his numbers were likely accurate. Next, Geoff asked the representatives whether their utility rates would remain stable. The company responded that this was a "difficult question," but that their company had been working to stabilize rates.

The following day, the team added to the new stories about their conversations with the utility representatives as a part of their project's narrative infrastructure to extend and protect the narrative from the owner's counterattacks. The ENCOM engineers met via conference call with the architect project manager and members of the owner team, including the new consultant. The purpose of this meeting was to review the design options and gain consensus amongst the owner team to continue pursuing these options—a chance to align the owners around the team's project narrative. After Martin presented his team's system options as described in the Mechanical and Plumbing report, the consultant asked about using gas power. When Allen asked for clarification, the consultant put forward his counternarrative to the team, responding that electricity rates were rising and his consultant team had created their own reports on gas pricing.

Martin countered this threat through presenting the story of his meeting with the utility company, which strategically framed the consultant's concerns as unfounded, while it also ensured that the story appeared aligned with the owner's financial concerns:

> Martin: "I have been looking at rate forecasts and have had conversations with the utility company. I found reports from reputable organizations and energy rates and made some assumptions from that information. . . .Yesterday we had a conversation with the utility company and they felt my rates were rational. The utility company is generating their own power now so we're not dealing with major rate fluctuations. So their projections are steady and low."

Here, Martin's storytelling supported the validity and reliability of his expertise, his research, and the team's project narrative through the two interrelated stories of his interactions with the utility representatives and his own research on energy rates. Martin glosses these stories to some extent, stating that the utility company "felt his rates were rational" rather than "likely accurate." He also omitted the utility's response regarding their rate stability as a "difficult question," instead claiming that they had "steady and low" projections. There is no room for doubt in Martin's performance retelling these conversational events. With his new stories added to the narrative infrastructure of the project, Martin was able to extend the narrative to frame their energy designs as reliable and aligned with owner needs while concurrently protecting their project from the external threat of the counternarrative.

Despite Martin's attempts, the consultant continued to push his own counternarrative, further testing its resiliency. When the consultant declared that gas-powered systems were a "no-brainer" for the hospital's back-up power system, Allen visibly cringed next to the speakerphone. The consultant continued to press again that his team's analysis showed a significant increase in

future electric rates. The architect project manager hedged the consultant's ideas stating that they were "great suggestions" that the team "might want to factor in." He then moved to close the meeting, quickly asking the owner team to confirm that the energy design options were "in alignment with the goals and policies" of the owner.

Despite the consultant's attempts to upend the team's narrative with his own counternarrative, the owners all agreed to the options described in the energy report, and the narrative infrastructure remained intact. When the owner team left the conference call, the project manager, Allen, and Martin discussed their continuing concern about the owner's pressing interest in low performing options. The team decided to continue finding ways to strategically communicate the financial advantages of high performing designs in order to keep their trajectory for the project—and their project narrative—alive.

While this project team began their narrative construction processes through initial sensemaking around vague owner goals, this case demonstrates how teams continue to organize and take part in narrative construction processes that are intended to protect and extend the narrative when encountering external threats. In this sense, narrative infrastructure also shapes teams' strategies against counternarratives. This included activities such as strategically framing the team's work as a collaboration between all project stakeholders, or organizing events that would produce new stories that extended the narrative infrastructure and protected it against the external threat.

These processes of extension are one reason why narrative infrastructures have resilience. Narrative infrastructures are malleable enough that they can be added to or altered to counter external narrative attacks. However, the resilience of these infrastructures is also due to the very nature of sensemaking in team-based narrative construction processes. Team sensemaking not only helps teams make sense of ambiguities, but works towards negotiating and mitigating the

conflicting obligations of team members. The narrative infrastructure that they constructed are resilient because sensemaking integrated the goals and expertise of those involved in creating the project narrative's shared meaning. Therefore, a threat to the narrative is also a threat to the obligations of the team, motivating them to organize and rally in defense of their project's story and decisions that their story shaped. In these ways, narrative construction processes establish malleable, but resistant infrastructures that not only shape strategies and decisions, but can withstand threats and challenges to its existence once put into place.

Discussion: Comparing the functions of narratives and their construction

Narratives are more than stories. They become a crucial infrastructure for teams' strategies for decision-making, future sensemaking, and sense-giving. Narrative infrastructures also mitigate disciplinary and organizational tensions in part because they allow for multiple interpretations to be voiced.

Thus, the narrative process is polyphonic and collaborative. On interdisciplinary teams, the narrative construction process consists of an iterative cycle punctuated by performance and negotiation. On both Banner Creek and T.J. Gambrill, team members performed fractured or short stories to one another about the client as a means of negotiated sensemaking, attempting to bridge between their individual expertise, disciplinary and organizational goals, and the priorities of other team members and the client. These negotiations resulted in a shared understanding about the project's narrative that, as a form of infrastructure, reflected the goals and expertise of the team, and constrained and enabled both internal and external strategies for decision-making around energy design options and opportunities. Once close to an external decision-making event, both teams negotiated how to give sense to their narrative about the project in the most strategic way. The team's collected stories and their shared meanings shaped these sensemaking

and sense-giving interactions. They then integrated the outcomes of these interactions and negotiations back into the project's narrative. This led to the team performing their narrative for their external audience, the client. In the performance of their narrative, the team shaped the client's own sensemaking around the future direction of the project.

The importance of sensemaking in the construction of narrative infrastructures cannot be overstated. Sensemaking is key for developing team-based project narratives that bridge between the individuals' goals and client priorities. Through sensemaking, narratives evolve and became the scaffolding that shape future meaning making and actions: constraining and enabling design options, interpretations of later events, and narrative performances for project decision-making with the owner.

Sensemaking helps to mitigate conflicting obligations and make sense of ambiguities to define what a project should be. In Banner Creek, the energy consultant team knew that a net zero design of the project would be financially and technically unfeasible for the owner. The energy modeler's expertise made sense of the owner's conflicting energy and financial goals through developing an alternative definition of net zero based on the hints of the owner's discourses and through negotiation with other team members. Likewise, in T.J. Gambrill, the hint of the owner having a vague and ambiguous "high performing" goal was reinterpreted in light of the expertise of the engineering team and through interactions with the architects, redefining "high performing" into a specific set of design options.

Narratives become project infrastructure through the scaffolding of the sensemaking process. Project narratives incorporate the outcomes of the team's prior negotiations among multiple conflicting goals and obligations. This was especially apparent in Banner Creek where negotiated sensemaking produced team consensus around a new definition of net zero, an energy

goal that became a crucial building block in the project's narrative and invoked (along with reference to the team's sensemaking process) in the later performance of this narrative to the owner.

Sensemaking is also part of what provides narrative infrastructures with momentum and makes them so tricky to change. In the case of T.J. Gambrill, sensemaking was used to redefine "high performing" into a set of design options with energy targets. Later, the appearance of a counternarrative about the owner's new energy agenda signified that there was an external threat to the project: that their current project narrative had lost alignment with the client. As this story about the owner's new goal circulated amongst the energy team, team members immediately organized to defend their own narrative, despite the indication that the project narrative and design strategies conflicted with the owner's goals. The team extended their project narrative by incorporating conversations with the utility company into their narrative infrastructure. When these new stories were performed to the owner, they countered the owner's new priorities while simultaneously bridging the team's and the owner's differing goals. Thus, by strategically extending their narrative the Gambrill team protected the narrative infrastructure. They defended their energy designs and information as simultaneously valid, authoritative, and sensitive to the owner's financial concerns. The Gambrill team clearly wanted to pursue one of the high performing designs to protect their companies' and individual reputations. They had, however, early in the sensemaking process, already instilled those differing agendas and areas of expertise into the project narrative that they constructed. The narrative infrastructure was resistant to change in part because the story of what the project could be was entangled in the needs and expertise of the individuals who constructed it.

In these ways, the narrative construction process of multi-disciplinary, inter-organizational project-based teams—a process at the intersection of conflicting organizational and disciplinary priorities—builds narrative infrastructures that shape strategy around decision-making. These narrative infrastructures appear to have the same "thrust" identified in Deuten and Rip (2000). Here we have revealed their organic, negotiated, and performed nature as they occur on teams. Storytelling, negotiated sensemaking, sense-giving, and performance all appear to be central to the narrative construction process that produces the scaffolding of a project's narrative infrastructure. While narrative infrastructure shapes and constrains pathways of action, they are created and continuously maintained and altered through processes of negotiations and performance. These performances and negotiations are both retrospective, in the retelling of events, and prospective in their anticipation of future discussions, team priorities, and project opportunities. They are also leveraged to manage the resilience of the infrastructure when under an external threat, while appearing to maintain alignment with the client's interests. Due to process of negotiated sensemaking at the beginning of the narrative process, project narratives incorporate team members' various interests and concerns. Thus, narrative infrastructures are malleable as new stories emerge, given meaning, and integrated into the narrative, but they are also difficult to change once their momentum is established. In this sense, narrative infrastructures develop organically through people's shared reflection about the past and anticipation about the future as they attempt to mitigate team and client priorities.

Conclusion: Lessons Learned & Directions for Research

As seen in these cases, teams produce and use narratives that become infrastructures shaping team strategies and decisions. The meaning-making processes involved in storytelling practices are inherently collaborative, while also embedded in—and reflective of—organizational and

disciplinary tensions. This means that teams are likely to defend their narrative infrastructures once set into place, making them difficult to change.

For practitioners, our research suggests that to manage these organizational and disciplinary tensions, team members require organizational communication structures that provide opportunities for interactive, negotiated, and iterative sensemaking with other team and client stakeholders. Through providing these opportunities for storytelling engagement, team members from different disciplines and organizations can make sense of ambiguous project goals together, while also providing space for encountering new stories about their client that can help them strategically mitigate client-team tensions at points of decision-making.

Having and making time and space on a project for storytelling opportunities also means that teams can co-create project narratives. These narratives provide direction for team member work and how to give sense around this work, its implications, and the values and meaning of these implications for the client. These narrative processes of sensemaking, sense-giving, and performance are key to managing stakeholder tensions and leveraging the individual priorities of team members. In this way, the stories that people tell about projects become the foundation of a processes that shapes their strategy.

For researchers, we assert that storytelling practices should be observed not just for what they say about individual perceptions and understandings, but how these stories become a part of a social structure that shapes organizational possibilities. In our cases, we analyzed how storytelling processes evolve and produce narrative momentum over the course of a project. One limitation of our work is that our analysis here is limited to team stories about the client. Many other stories circulated amongst the project teams and became integrated into the larger narrative about designing for energy efficiency, including stories about industry trends, work activities,

and technical stories about different design options. Future research could observe how teams weigh, assemble, and integrate multiple story types into narrative infrastructures to shape decision-making.

Another limitation is that our analysis is limited to project-based teams and only during the early phase of design; we were not able to assess how early narrative construction processes impacted or led to the final design. Future research could observe teams during multiple phases of project development to uncover how these processes shape decision-making across a project's timeline. Researchers could also investigate how these processes might impact at a larger scale than project-based teams, for example, how narrative processes impact industries over time.

We hope others will take up the challenge of observing the narrative construction process on teams, in part because there is more to understand about how strategy is formulated during this process. Do certain types of stories carry more weight? Do actors organize in other ways to protect narrative infrastructures? Do new or emerging types of data or analytics used in the workplace change how stories are told or whose stories are considered more authoritative in negotiation? Our work shows that the stories people tell become the foundation of a collaborative process that shapes strategy. Organizational scholars would be well served to take up these questions.

Acknowledgments

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