Scripting a Collaborative Narrative: An Approach for Spanning Boundaries

by Tom Flanagan

A tool called Interpretive Structural Modeling gives design teams a graphic image of their thinking. This "storytelling," as Tom Flanagan characterizes ISM, accentuates the hierarchy of inputs and their interrelationships. The result is more transparent and productive interactions, as well as improved performance among those charged with strategic design, product development, and operations.

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Design leadership increasingly depends upon the power of influence in a world of information overload and emerging civic concerns (that is, environmental sustainability and social responsibility). Ideas drawn from multiple and disparate individual sources can be effectively combined through structured dialogue; however, even a highly structured dialogue can become a slippery substance with the passage of time. In complex, rapidly changing environments, design teams can become trapped in cycles that cause participants to lose track of progress that has been made. Oral traditions are reemerging as a means of grounding groups coping with information overload.

In an earlier issue of this journal, Eun-Kyong Baek provided an insightful summary of the importance of narrative thinking in design management.[1] Stories can be informative, inspirational, and enabling. The process of creating a shared story is powerful on all these levels—if done effectively. To be done effectively when one works with technical experts, design managers need to engage both paradigmatic, technical thinking (that is, thinking shaped by formal frameworks and experiences) and imaginative thinking. The challenge in critical and creative design is to engage both of these modes of thinking concurrently within a single design process. The trick is to do this in an engaging fashion.

1. Eun Kyong-Baek, "Stories: The Way We Inspire Ourselves and Each Other." *Design Management Review*, vol. 17, no. 3 (Summer 2006), pp. 35-40.

Design as a learning and recollecting process

In the Information Age, too much information is formally equivalent to too little information—both lead to poor decisions and underconceptualized design. Designers recognize that meaning unfolds from information in an iterative fashion as members of a design team share ideas, and that the scope of ideas can be enriched by pulling together individuals with very different perspectives. At the same time, productive design requires rapid and coordinated unpacking of complex ideas and durable synthesis of new meaning. Considerable attention has been directed at ways of promoting the exchange of ideas and understandings within such diverse groups.

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Putting design teams onto the same page comes first. This involves a struggle to establish the definition of a problem. It can be a messy business, particularly when the design involves experts. Experts are trained to anticipate problems and thus come to the table prepared to offer solutions. Invariably, this leads them to enter a design process with preconceived notions of design outcomes. Even with the standard appeal to focus on restating the challenge as a group, expert designers frequently seek to leap into the "solution" phase of the discussion. The resulting collision of good intentions can set a tone that favors recollection of areas of disagreement over areas of agreement.

When groups are reminded of the areas of their strong agreement, it is easier for members to recall the structure of the complex design and collaborate to support its evolution. To make areas of agreement memorable, design managers need to tell appropriate stories of the design process. Dialogue tracking approaches provide scripts of varying utility. One tracking approach—interpretive structural modeling (ISM)—provides a powerful outline for visualizing and sharing a systems view of relationships agreed to exist among design elements. Narratives that reinforce the extent to which large and diversified groups agree on key issues helps organizations and communities to build their capacity for collaborative design. For these reasons, the stories we tell about design either enable or disable not only our most challenging projects, but also our very capacity to take on challenging design projects in the future.

This article illustrates the application of interpretive structural modeling in the context of structured dialogic design (SDD) as a means of enabling narrative management for complex collaborative design. The complexity served by this approach involves groups that: 1) cannot meet as frequently as they would like to meet; 2) have not worked together closely in the past; and 3) must work together collaboratively to achieve their goals.

Questions that catalyze design

How do design managers go about crafting a shared story that will bring a busy design team onto the same page? How are the voices of all the experts brought into harmony in the definition of complex design requirements?

Traditionally, a design manager might offer a summary of the design challenge, and this type of straw-man statement can be effective within certain levels of complexity. At some threshold of complexity, though, the context for design needs to be "discovered" by the design team. In those instances, the design manager needs to lead the discovery process, and if it's done effectively, the story of what has been discovered can be a compelling management tool.

What constitutes a great question to ask to begin an inquiry into the context for collaborative design? In its generic form, a reasonable trigger question asks, "What barriers or oppor-

tunities do we need to consider in our effort to reach a specific goal within a specific time frame?" Systems development teams will recognize this as the launch of a requirements specification phase. Participants who are technically trained will respond to this from their paradigmatic perspectives, and a diversified group will explore differing paradigms for approaching the problem. Design managers can use this opportunity to map how differing views are connected in a deep understanding of the design challenge. When a formal sequence of idea elicitation, clarification, clustering, and systems structuring is applied, the resulting mapping approach is called structured dialogic design (SDD). Deep understanding constructed in this way provides a solid foundation for creative design and a resource for crafting memorable stories.

Anticipating the evolution of the story

To construct its own narrative, a group needs to slow itself down so that it can jointly build an outline. This is because people work more rapidly on their own than in a group. Pacing the dialogue requires a balance between evidence of shared understanding and evidence of joint progress. The way this understanding and progress is captured contributes to the emergence of the group's story. Structured dialogic design collects labels for ideas that are silently constructed by participants through nominal group technique. Labels are used to announce ideas and are printed and displayed on the walls. Their meaning is filled in through discussion using nominal group technique (an alternative to brainstorming developed by Delbecq and Van de Ven).[2]

Once ideas have been collected, the group then begins a cycle of clarification. Ideas are augmented with clarification statements, and the entire document is presented to the group at the close of this phase of the design process. This clarified list of design requirements provides an incomplete understanding of the design challenge. To improve the shared understanding, design managers seek to converge on a short list of "preferred" design requirements.

These preferred design requirements do not, however, provide a complete understanding. The missing piece is an understanding of the relationships that connect the design requirements into a system. It is this systems view that provides a group with a powerful script for telling its design story. If preliminary steps have been appropriately followed, a group can generally construct a systems view of relations among a prioritized set of requirements in a fraction of the time needed to identify those requirements.

Narratives based on a shared understanding of relationships are inherently more compelling than narratives based on requirement lists alone.

Capturing relationships among design requirements

While multiple graphic methods exist for capturing a view of interrelationships, interpretive structural modeling is uniquely used within structured dialogic design. ISM makes it easier to create narratives because it applies the uniform logic of "influence" for making connections among ideas. This means that the nature of a connection flows throughout the entire structure. In contrast, less-structured maps illustrate connections but obligate readers to accurately recall the nature of each specific connection as they move across the web of connected ideas. ISM specifies a consistent relationship (such as "significantly improves the prospects of success of …"). As one reads an ISM map, one can see how the group has agreed that "addressing requirement A significantly improves the prospects of success for addressing requirement B," and so on. The readability of the graphic map—that is, its translatability into narrative form—promotes the emergence of the group narrative and, in some cases, the graphic map actually serves as a stand-in for that narrative.

Telling the narrative

Individuals who own a story need to be able to tell their story. Groups that own a story need to

2. Delbecq, Andre L., and Van de Ven, Andrew H., "A Group Process Model for Problem Identification and Program Planning," *Journal of Applied Behavioral Science*, 7 (4), 1971, pp. 466.

be able to tell comparable versions of that same story. Telling the story is talking the walk. When groups deal with complex design challenges, they need to have a readily shared, readily readable script so that they can sculpt their narrative from the same true cloth.

Such a script functions as an anchor, as well as wings. It both reminds a group of what it has agreed upon and enables the group to go forward in unison. Design management efficiency can be enhanced by cultivating a standard way of mapping systems thinking and enabling group narrative sharing. For design managers working with technical experts and complex design challenges, it is more important to get the choir singing than to sing to the choir.

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Allowing the narrative to evolve

Living stories are more compelling than static stories. As new information becomes available or as prior information becomes irrelevant, some forms of story scripting require stories to be entirely rewritten. As an element is inserted into or removed from the ISM map, however, the method provides the capacity to weave the new information into and around the more familiar information. Software that supports the construction of ISM maps readily supports the deletion of design requirements without loss of the resulting pattern. New design elements are woven into the pattern by repeating a single cycle of pairwise mapping (see the case study below for an example) that was used to initially construct the map. This capacity encourages managers to update and continue to use the map to support continued and evolving understandings about complex design challenges.

Case study: Narrative management of the creative economy

Narrative management is useful for coordinating transformative design when physical models or graphic prototypes are unavailable. This is particularly true when groups are developing complex product architectures—such as a radically innovative hand-held biosensor for a physician's office or a protocol for using diagnostic software in a busy primary-care office. Narrative management can be used to capture and report requirements from large focus groups or diverse stakeholder communities. To illustrate how a large group's differing requirements can be captured in a memorable narrative, consider a community of design professionals seeking to expand a city's creative economy. In this complex example, the city of New Bedford, Massachusetts, convened a group of 45 professional designers, design managers, and economic development officers to explore the question, "*What are the key existing and anticipated barriers the city must consider as it works to significantly expand its creative economy sector within the next five years?*" Each participant was asked to name five requirements that he or she felt needed to be considered. The effort produced a list of 55 requirements that were reduced to a focused narrative based upon strong consensus for the central role of 14 of these requirements.

Structured dialogic design was used to collect and clarify requirements. In round-robin fashion, the author of each individually named requirement clarified his or her idea. Redundancies were identified, and the group then adopted a clarified list of 51 unique requirements. The group then was led through a process to sort "similar" requirements into clusters, which they named as: 1) inclusive collaboration; 2) systemic adaptive planning; 3) image making; 4) capital formation; 5) twenty-first-century learning; 6) perceptions internal/external; 7) infrastructure for quality of life; and 8) changing values. In this fashion, the group collectively discovered a set of 51 key requirements and 8 "dimensions" of their design challenge.

Participants voted by attaching colored dots onto five requirements they felt were "most important" to address in the design. Voting provides participants with an opportunity to exercise their individual power. Voting also provides a catharsis for strong personalities who may need to make definitive public statements to relieve the pressure of being constrained to work within a group. Most important, voting reveals where participants have elected to adopt requirements named by others in the group. This provides visible evidence for collective learning.

The number of votes collected for specific requirements foreshadows the direction in which the group is thinking; however, until requirements have been structured, this foreshadowing is deceptive, so voting results should be taken gently at this stage. As depicted in Table 1, this group identified 14 "highly preferred" requirements, 11 "less preferred" requirements, and 26 requirements that received no votes.

Preferred requirements were "structured" into a map to reveal a systems view of their influence on the design challenge. Before discussing the mechanics of interpretive structural modeling, it is important to emphasize the critical role played in developing the foundation of understanding within the group by nominal group technique. The method is practiced with different levels of rigor by different design managers. When using ISM, it is critically important to build a strong foundation by getting the bricks sorted out and neatly stacked. This is to say that groups need help to "unpack" complex ideas and address each of them as single concepts. This is absolutely required if ideas are to be connected using ISM, because a compound idea can be involved in multiple and conflicting relationships. Ideas must be reduced to an elemental level to appropriately construct influence maps using ISM.

Strongly Preferred Requirements.			
Rank	Sequence	Votes	Label
1	#1	16%	a plan and a leader
2	#12	15%	a common brand
3	#4	13%	incentives for recruiting talent
4	#44	9%	link to K12 education
5	#6	8%	social image of city
6	#22	7%	coordination for stakeholders
7	#3	5%	inclusive participatory planning
8	#18	4%	city transportation infrastructure
9	#40	4%	harbor tuned to tourists and residents
10	#41	4%	youth leadership support
11	#55	4%	promotion of arts community
12	#5	3%	economic image of city
13	#21	3%	financial stability for arts
14	#50	3%	investment in education reform

Table 1. In this example, a group of designers considered how best to expand a particular city's creative economy. The table shows a list of 14 preferred requirements that were voted on from a list of 55.

Prior to structuring requirements, the New Bedford group identified, clarified, clustered, and voted on approximately 50 complex ideas within about five hours. This means that the design team resolved ideas at an average rate of one idea roughly every 5½ minutes. Interpretive structural modeling sessions begin with a reflection on prior work, which is placed before each participant in the form of a summary document.

Mapping begins with the requirements that received the highest numbers of preference votes. This honors the preferences expressed by the group and assures its members that the most preferred requirements are woven into the initial systems view. The group builds its roadmap through pairwise comparisons in response to a structuring question framed for the specific design challenge, for example: "If we make substantive progress addressing requirement A, will this *significantly* help us to address requirement B in the context of expanding our creative economy sector in the next five years?"

Creating and reading the ISM map

With a set of 14 requirements, 182 symmetric, pairwise comparisons are possible. To reduce this burden, ISM software uses a "logic engine" to track transitive relationships.[3] (ISM software is available at no cost through the Institute for Twenty-first Century Agoras.) If the group has decided that addressing requirement A strongly

influences the ability to address requirement B and if the group also has already decided that addressing requirement B strongly influences the ability to address requirement C, the software applies the inference that addressing requirement A will influence addressing requirement C. In this fashion, the ISM software reduces the pairwise comparison workload by about 70 percent. For the creative economy design team, 61 (or 35 percent) of the full set of pairwise comparisons were evaluated during a two-hour mapping session. Stated another way, the group made pairwise decisions at a highly efficient rate of one decision every two minutes.

ISM results in a graphic "map" of the group's decisions (see Figure 1). In the City of New Bedford case, the resulting roadmap was evidently in strong concordance with the view of a member of the design team, who asserted that he had suspected all along that this was the essence of the challenge. In such instances, the ISM map is a validation of individual thinking, as well as a tribute to the explanatory power and vision of a participant. The ISM map, however, is not an individual construction. For most participants in any design team, ISM maps represent a genuine breakthrough, but they become a group product only as a result of the group design activity. The ISM map shown in Figure 1 was accepted as an accurate and legitimate consensus view by the group as a whole.

ISM maps are read (interpreted) by participants in the design group in the form of a story. Individuals are invited to tell the same story in their individual ways with reference to the map. In this way, the ISM map is the script for a story of the system of requirements that the group most strongly feels must be addressed to achieve success in the design project.

An ISM map is typically read from bottom to top, starting with "deep drivers" of influence that act across the entire system of barriers. This directionality helps to set the narrative into motion. The following narrative represents an intrepretation of the New Bedford group's script:

> *"In the view of 45 community members of the creative economy, the most influential barriers the city needs to address are the challenge of building an action plan behind an effective community leader, coordinating with stakeholders, and assuring inclusive participatory planning. By addressing these barriers, the city will improve its prospects for shaping the harbor for both tourist and resident appeal, and this "tipping point" will help the city to develop a common brand, as well as to improve prospects for enhancing its transportation infrastructure. Addressing the deep barriers of the need for a leader and a plan, coordination among stakeholders and inclusive planning also will help the city address barriers in securing investments for educational reform, enhancing youth leadership, and linking the creative economy to the K12 curriculum. And by addressing this set of barriers, along with success in addressing transportation infrastructure, the*

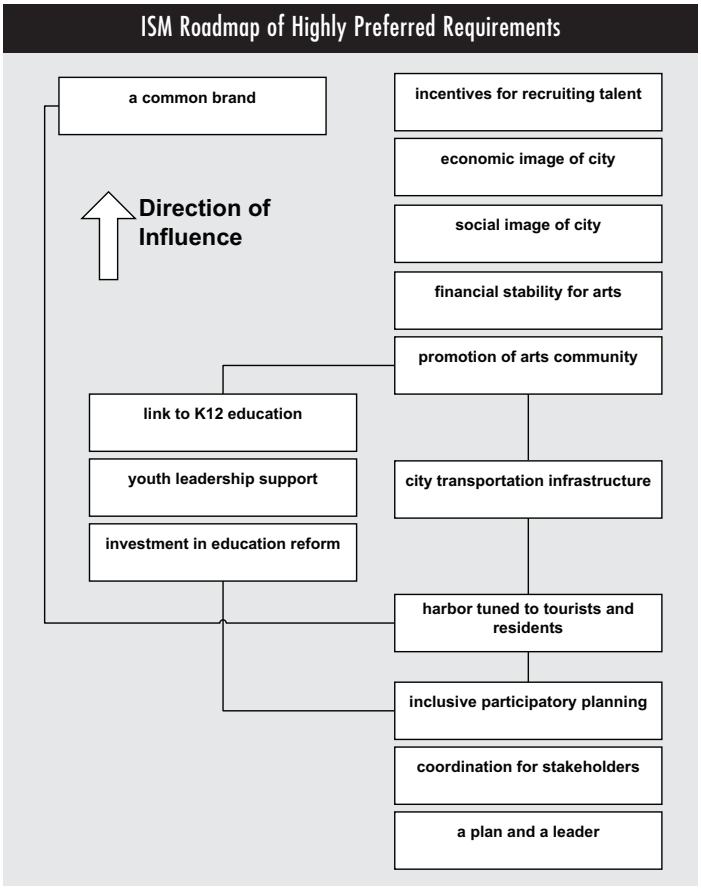

Figure 1. This interpretive structural modeling "roadmap" shows multiple routes of influence.

3. For details, see Alexander N. Christakis, with Kenneth C. Bausch, *How People Harness Their Collective Wisdom and Power to Construct the Future* (Greenwich, CT: Information Age Publishing, 2006).

city will be better prepared to promote the arts community, assure the financial stability of the arts, boost both the social and economic image of the city, and offer incentives to continue to attract talent in to the local creative economy."

The beauty in the use of an ISM map as a script is that it focuses the story on agreements related to requirements and relationships, rather than on word choice and syntax, or hard-won arguments. Traditional efforts to harmonize group statements are almost always protracted and become painful ordeals. Seeking to "harmonize" language is unnecessary if a group has harmonized meaning. The script resulting from an ISM map makes such coercive harmonization irrelevant.

Narrative management produces results

The ISM map developed by the city's design team was used to drive action. The group convinced itself to focus on the three deepest requirements in the ISM map and, with an additional half-day of work, generated 51 action options. The members identified preferred-action options, which led to the launch of a best-practice survey in related cities. The best-practice survey resulted in 81 practices that were judged relevant to the city's needs, and highly preferred best practices were mapped back onto the group's original ISM roadmap. This resulted in an augmented ISM map and an expanded story, and this expanded story explained how a best practice used elsewhere would influence all the city's high priority requirements. A board-level decision was promptly made to act upon the group's findings.

Summary

Talking the walk (design) is the earliest manifestation of our intentions. It is the story that gives rise to the vision. However, imposing an individual voice to represent the voice of a group is problematic. Transformational design frequently requires approaches that distribute ownership of complex design requirements among many voices. Distributing ownership of ideas within a community of stakeholders fosters and sustains the collaborative energy needed to implement action plans. Narrative storytelling is a powerful tool for this purpose. Groups that reflect on collective cognitive maps of their shared agreements "listen" to the voice of their group. When these maps are used as scripts for narrative management, groups can more readily recognize and recall their shared understandings. This makes life easier in a world of faster cycle times, expanded constituencies, and information overload.

Oddly, perhaps, much of the technology discussed in this article is not new to the design community. The ISM approach has been validated in more than 30 years of work in the field of interactive management and has been embraced and rigorously critiqued in the field of systems science. In this short review, however, what is special about the way this subject matter is approached is that is used as an enabling mechanism for narrative management. Those stories that are too complex to tell are also too complex to remember or to resolve.

Acknowledgements

I am thankful to Peter Jones, Alexander Christakis, Kevin Dye, and Kenneth Bausch, all of whom have shared their considerable insights in the application of structured dialogic design in the context of their design management practices.

Suggested Readings

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Reprint #08193FLA82