Making Sociotechnical Systems Thinking Stick

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Abstract

Sociotechnical systems design is crucial to the success of digital transformations at all scales. Unfortunately, the explicit use of sociotechnical systems thinking is limited in research and practice. We leverage a different framing (Thinking in 5T) to understand cases where people sustain the practice of sociotechnical thinking.

Keywords: Sociotechnical Systems, Sensemaking, Thinking in 5T, Hybrid work, STS

1. Introduction

Sociotechnical systems (STS) design (e.g., Trist, 1981) supports organization effectiveness. STS includes two central tenets: organizations are open systems dependent upon their context (or environment); as systems, their human and technical components are highly interdependent. STS designs optimize the fit between the organization and its context and the mutual adaptation within the human-technical interface.

Because of the interdependence of the human, technical, and contextual aspects of organizational reality, there is no "silver bullet" for achieving whole system effectiveness. As Brooks (1987, p. 10) wrote: "There is no single development, in either technology or in management technique, that by itself promises even one order-of-magnitude improvement in productivity, in reliability, in simplicity."

Unfortunately, it is rare in research and practice to see an explicit consideration of intertwined social and technical considerations. From at least 2002 to today, scholars have highlighted this as a problem (Griffith & Dougherty, 2002; Malhotra et al., 2021; Sarker et al., 2019; Zammuto et al., 2007). Malhotra et al. (2021, p. 1387) say, "the frequent calls for attending to the multifaceted and specific roles that technology plays in contemporary organizing are not being adequately heeded in organization science scholarship." Some note that STS is complex (Bostrom et al., 2009) and that complexity limits STS' utility. However, our consulting, classroom, and workshop experiences suggest that people across industries can effectively apply STS thinking if offered an effective scaffold.

We draw on Griffith and Mangla's (2022) "Thinking in 5T" as a "sticky" approach to sociotechnical systems. Thinking in 5T highlights talent, technology, and technique, aligned to a target in light of the times.

2. Reframing STS: Thinking in 5T

We offer these examples of the 5Ts drawing on the case example to follow:

1. Targets: On-spec installation of new human resource management and payroll system; on-time response for accounts payable; on-budget completion of maintenance shutdowns
2. Talent: Leadership style and skills; employee digital skills
3. Technology: Collaboration software; ergonomic home office facilities and layout
4. Technique: Coordination mechanisms with customers and colleagues; protocols to govern flexible work
5. Times: COVID hybrid transformation of work, corporate, and local context

Our use of the "Thinking in 5T" framing is a typological simplification - a trope (Toncar & Munch, 2001) to help people remember STS - not a theoretical change to STS. The goal is to keep the critical dimensions of talent, technology, and technique (and the need to manage these dimensions in concert), top of mind such that individuals can craft their work (Tims et al., 2013; Wrzesniewski & Dutton, 2001) more effectively. Figure 1 offers a simple depiction of the framing.

URI: https://hdl.handle.net/10125/102797
978-0-9981331-6-4

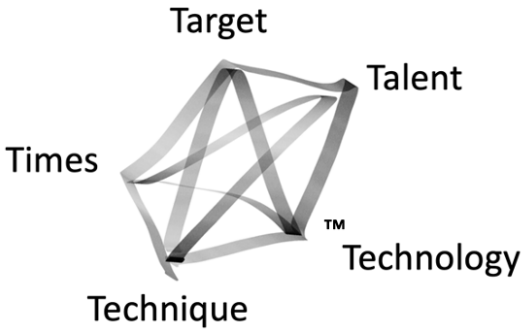

Figure 1. Thinking in 5T™

3. Sociotechnical Systems Thinking in Practice

During the early stage of emergence from the COVID pandemic (Spring of 2021), employers and employees often debated what the prescription would be for 'return to office' work. The study described in this paper is based upon the request of one manufacturing company for external consultation to help resolve this question with its staff groups in functions such as Accounting, IT, and Engineering.

The first author took on the role of consultant. The consultant involved staff and managers in designing a 'hybrid' form of remote and in-office work jointly optimized for the requirements of the business and employee aspirations for work flexibility. Within parameters set by corporate and senior management, the consultant guided the process based on research and applications of STS development for knowledge work, notably in virtual work organizations (Majchrzak & Gasser, 2000; B. Painter, 2002; G. Painter et al., 2016).

3.1. Designing a new 'Hybrid' form of work

Facilitated by the consultant, specific functional groups of a dozen or so staff and their respective managers designed their new work arrangements over four virtual (90 min.) workshops. Participants assessed their needs, resources, and possible enhancements for components of each of the ten elements in a simplified (but not expressly 5T) sociotechnical systems design framework.

For example, one design element was information technology, with hardware for mobility between home and central offices; and software for information management, virtual collaboration, and knowledge-sharing, along with effective cybersecurity. Another technical element was the central office layout for which staff, in this case, chose to add more small group collaboration facilities and limit permanent solo workspaces.

An important organizational element was the development of coordination mechanisms for various degrees of task complexity with customers and colleagues. Socialization processes (formal and informal) were another such element to support relationship-building and culture development.

Indeed, a stronger caring, performance-based work culture was a focus of this design, accompanied by a 'mentorship' style of leadership to cultivate purposeful action and growth by all staff, no matter how dispersed they were.

Finally, the consultant led a review of the full set of STS elements. Each staff group completed the first design phase with a strong sense of accomplishment, support from senior management, and a robust action plan to guide their iterative detailed work design.

3.2. The Challenge of Sustaining the Sociotechnical Systems Design

Over the next 18 months, the work of staff groups in this manufacturing company evolved into a 'new normal.' Through weekly hybrid meetings and monthly in-person team meetings, individuals and groups refined, implemented, evaluated, and updated their action plans, independent of the external consultant. The participants physically transformed their home and central office spaces. They upgraded information systems and improved their use of digital tools and communication channels. Teams also developed and maintained service-level agreements for staff coverage and accessibility for internal and external customers. These results were consistent with STS expectations in their multidimensionality and focus on joint optimization.

While the staff fulfilled most items of the action plans, many unforeseen events challenged the new hybrid work environment and its STS approach. Corporate and circumstance-driven crises called for adjustments in the work outside the scope of the staff action plans (e.g., continuous revisions of COVID protocols, supply chain issues -- especially local issues when flooding washed out roads and railways). Some staff feel overrun by events, and most have lost sight of the sociotechnical systems design framework that guided the original designs.

Given decades of evidence around threat-rigidity (Staw et al., 1981), it doesn't surprise us that crises triggered a reversion to more unidimensional thinking. However, decades of research also highlight the value

of frameworks and artifacts for sustaining complex change and thinking (Glaser, 2017).

4. Future Implementations

We propose that a trope can provide a robust and sticky tie to the complexities of STS thinking, "Thinking in 5T" -- even when circumstances push people to action with little time for reflection. The application of STS is itself an STS process and Thinking in 5T is not a silver bullet. Combining deeper initial training leveraging an artifact focused on Thinking in 5T, extended involvement with STS experts, and shifts in formal change protocols can all help embed systems thinking in work design.

5. Conclusion

Our case shows better outcomes when sociotechnical thinking is top of mind: individuals and teams can better adapt their work to reach their targets by managing their talent, technology, and technique in concert and in line with the times. While traditional sociotechnical framing can work, people may find traditional STS framing complex and hard to implement. Scaffolds, such as TOP-MODELER© (Technology-Organization-People, Majchrzak & Gasser, 2000) or Thinking in 5T™ (Talent, Technology, Technique, aligned to the Target and the Times, Griffith & Mangla, 2022), likely have greater retention in organizational settings.

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