Time warps in sociotechnical systems: social science or science fiction?

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The paper *Digital sociotechnical systems design*, (Winby & Mohrman, 2018) creates a time warp, a crease in the fabric of time whereby the period from 1967 to 2018 simply disappears. It is as if that period never existed and had no consequences.

That paper is not alone; there appears to be a whole growing genre of such efforts as for example, Passmore et al, 2019. They are all characterized by the same time warp.

In that paper under review here, the authors are proposing a brand new concept they call digital sociotechnical systems (DSTS) which will in its application, address the current organizational mess that has been created in recent years by such means as the unregulated advent of digital technology, plus well intentioned but ignorant attempts to fix that mess such as Agile (Emery, 2023).

Now when it seems it seems we may have gotten to peak mess, along comes AI, not only to compound the mess but also to create even more anxiety and frustration about the inability of so many of todays' organizations to function effectively. This latter applies whether the focus of concern is either for their own organizational performance or for the welfare and wellbeing of the people who have to work in them. Mind you, there are often plenty of people making plenty of dollars from them regardless of the shambles they may be presenting in different areas.

One of the reasons we have this mess in organizational systems is that social science, particularly its organizational change divisions, is itself a terrible mess. The field comprising consultants, academics, managers, workers, journalists, editors plus just interested people, is almost totally laissez-faire. It is almost totally ahistorical. And therein lies the fatal flaw that permits such time warps.

Basically in organizational change today, anything goes, papers regularly get published promising great results for a brand new method or concept with minimal or no evidence or conceptual validity behind it. Perhaps the author did something once and it worked so we have yet another world shattering breakthrough. From then on it is marketing, marketing! This is not 'science', it is making money. Much of this field really lost its right to be called social ***science*** a long time ago. Winby and Mohrman's paper fits neatly into this ahistorical and laissez-faire world.

The time warp

One of the strangest things about this paper and the one that gives rise to the time warp is the one and only reference they provide to sociotechnical theory, its concepts, design or consequences. It is a short paper by Emery & Trist quoted in Passmore and Sherwood, 1978. It is even more strange when we consider that of all the really consequential papers written by Emery & Trist collectively or separately before 1978, Passmore and Sherwood chose this one.

Not only that but by 1978, there was a new method for analyzing and designing sociotechnical systems, based on powerful new concepts, which had been used countless time since 1971 and proven itself. These developments were known about in North America as not only were they published, they had been presented and discussed at more than one STS Roundtable, a major forum for the field. However, nothing about them was included in Passmore and Sherwood. It was as if they did not exist.

The paper they included is called *Analytical model for sociotechnical systems.* It was not considered important enough for Fred Emery to ever include it on a bibliography or CV, nor did either Emery or Trist consider it sufficiently important to include in the second volume of the Tavistock Anthology, devoted entirely to the whole realm of sociotechnical studies. Nor was it even mentioned in any of the historical overviews in that anthology. In other words, it was almost entirely inconsequential.

I have not read this paper. However, I have read *Analytical model for socio-technical systems,* 1967, by Emery, Foster and Woollard. It was one brief exposition of a step by step process of analysis of a production system ending with making proposals for change, obviously a summary or overview of process before the discovery of the genotypical design principles.

The abstract for this paper states:

"The analytical model has been developed as a practical tool to help line managers implement the concept of joint optimization in their own departments or sections. It is hoped that it will enable managers to examine their existing technical systems and existing organizations to gain insight into the technical and social systems and to improve the level of performance. The model is concerned solely with the analysis of production systems and the development of change proposals."

This leaves little doubt that the paper Passmore and Sherwood published is a version of this 1967 paper; its vintage – sometime in the 1960s.

So the one and only reference to sociotechnical studies was one small, rather inconsequential paper published before the big conceptual and methodological breakthroughs took place.

These further breakthroughs totally revolutionized STS and left it looking almost nothing like that presented by Passmore and Sherwood. So Winby & Mohrman's paper takes as its starting point, a concept and set of practices which they knew had totally been left behind as the field had been revolutionized during the time warp.

The warp period 1967-2018

The first major discovery was of the genotypical organizational design principles (Emery F, 1967). The second building on the first was the totally new method for analysis and design using these design principles and all the new knowledge accumulated during the Norwegian Industrial Democracy Program (Emery & Thorsrud, 1969; 1976). The method was called the *Participative Design Workshop* (PDW) (Emery & Emery, 1974) and the principles which necessitated its creation are presented in Figure 1.

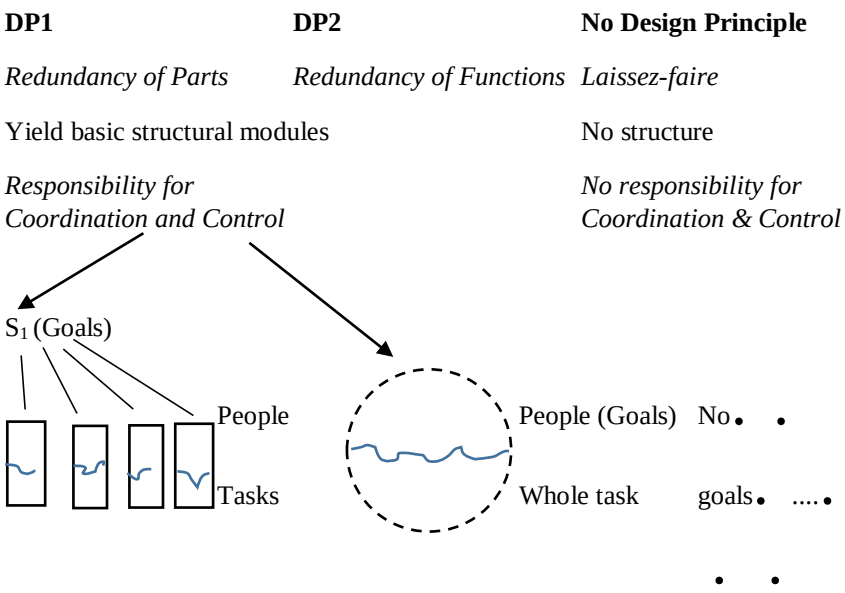

Figure 1. The Genotypical Design Principles

These three options constitute a complete set – responsibility for coordination and control can either be with the actors, or not, or there is no responsibility for coordination and control.

In DP1 responsibility for coordination and control is located at least one level above the action. Therefore, the DP1 organization is autocratic or bureaucratic. It is the master-servant relation in action where those above have the right and responsibility to tell those below what to do and how to do it. It is a structure of personal dominance, a dominant hierarchy.

DP1 creates a competitive system so to get ahead, or even survive in some cases, one must compete. As soon as people are forced to compete, they have to look after their own interests, and self-interest comes to dominate life in a DP1 structure. Years of exercises such as team-building have shown they cannot change this dynamic.

In DP2, responsibility for coordination and control is located with the people performing the task. The self-managing group, previously called semiautonomous (F. Emery, 1980), works to a comprehensive set of agreed and measurable goals. Large DP2 structures are non-dominant hierarchies of function where all change is negotiated between peers.

DP2 has markedly different potentials than DP1. Rather than individual jobs, the whole group is now jointly responsible for every aspect of the task. Because they are working together to achieve agreed goals for which they are collectively responsible, it engenders cooperation.

Over time DP1 deskills and demotivates, DP2 skills and motivates (Emery & Emery, 1974). DP1 causes dependency, fight or flight, pairing (Emery M, 1999) and amplifies communication problems and personality conflicts (Emery & Emery, 1976; Emery M, 2004). These design principles also appear to operate across the animal, biological or cellular and mechanical realms (Emery M, 2003).

Similarly, DP1 structures amplify, while DP2 structures attenuate errors (Beer, 1972, in Emery F, 1977) so only DP2 produces an organization “structured in such a way that its

members can learn and continue to learn within it" (Emery M, 1993a, p. 2). There is no implication here that organizations can learn.

The design principles operate throughout society, underlying political or governance systems in the same way as single organizations of all types. DP1 yields representative structure, DP2 alternatives are available (Emery F, 1974, 1976a, 1989). For more details about these principles, consult the website www.socialsciencethatactuallyworks.com.

Table 1. Summary of Language Evolution and Position of Responsibility for Coordination and Control

Organization	*Autocratic*	*Participative Democratic*	*Laissez-faire (None)*
Old language: **Process:** sociotechnical systems design (STS or STSD)	Non jointly optimized sociotechnical* Basic modules are sections of individuals + supervisor	Jointly optimized Basic modules are semi-autonomous groups	Neither
***New language*: Process:** PDW for democratization	DP1 structure Basic modules are sections of individuals + supervisor	DP2 structure Basic modules are self managing groups	No structural relationships
Location of responsibility for coordination and control	Not with actors	With actors	No such responsibility

* Where sociotechnical includes sociopsychological and socioecological

Table 1 shows the historical changes in language. Practitioners today working with the efficient new methods for changing the design principle don't talk about jointly, or non jointly optimized or sociotechnical systems analysis and design. While these terms are still formally correct, they are outdated and misleading. The new language directly refers to the design principles, their structural results and their consequences.

The PDW is simple and quick:

Phase 1. Analysis
Briefing I. DP1 and its consequences
Groups determine their scores on the psychological requirements for productive work (6 criteria). These are the intrinsic motivators.
Groups fill in the matrix for skills and knowledge held.
Phase 2. Change
Briefing II. DP2 and its consequences
Groups draw up their workflow(s), and
The formal legal structure of their section or small organization. *They then redesign the structure to DP2.*
Phase 3. Practicalities, tasks to ensure the design works well in practice.
Agreeing a set of comprehensive measurable goals
Determining training requirements
Drafting career paths (if required)
What else? An open category where groups examine the design from every angle to determine what other changes may be required, to layout, technologies, etc.
Groups should be able to show how their design improves the original scores on the 6 criteria.

The PDW can be done in a day and as it is a very flexible method in its application, there are many possible variations to suit every organization (Emery M, 1993b).

The changes accruing from the PDW were immense as it was not a long tiresome and costly, expert driven process but a simple method whereby the people who worked in an organization redesigned their own organizational structure. There was no design team or

outside experts. There was no detailed analysis of variance as Emery, Thorsrud and the Norwegian scientists had leant that the people who worked in a place knew all the critical variances involved and would automatically build that knowledge into their designs.

Similarly, there is no heavy analysis and redesign of the social system. The design principles and laissez-faire (Lippitt & White, 1943) are the basis of the social system so participants are given two briefings about the two principles and their consequences. After the first briefing about the first principle, DP1, two quick forms of analysis are done, first a measure of what the organization is doing to its people through the 6 criteria or psychological requirements for productive work. The second employs a simple matrix of skills and knowledge held each person in that unit or section, against those essential to keeping the organization working. These simple analyses show exactly what needs to be done by way of training for multiskilling to get the organization up to scratch, which the participants will later build into their designs.

After the second briefing on the second principle, DP2, the participants first draw up their formal legal structure and their workflow(s). They then redesign *their structure* from one based on DP1 to one based on DP2. In Part III of the PDW, participants complete a series of practical tasks to ensure the designs will work well in practice.

Most workers loved it, still do, and it diffused fast, delivering large and in some cases almost incredible increases in productivity along with, not opposed to, increases in intrinsic motivation, creativity and job satisfaction (Emery M, 2008).

A unified approach

At the same time as the PDW was evolving to become the highly reliable method it is today, Merrelyn Emery in particular was researching the Search Conference from its 1959 origins. While the PDW addressed organizational structures, the SC was designed for planning and policy making. It had already become clear that its structure must be firmly based on DP2 without deviations, and that the concept of the open system needed to be much better integrated into the overall design process. In addition, there were other critical concepts such as the human ideals, the conditions for effective communication, and Bion's basic assumptions which were known to be playing a role in the success or failure of the method. It did not become clear why until 1985 (Emery M, 1999, 115-136).

As we perfected these methods, we were also solving the problems of for example, numbers much bigger than could be reasonably handled in a single Search, without sacrificing reliability. In particular, the problem of why some Searches failed, not in the event, but in the long periods of implementation was also finally solved. This led to the breakthrough in the integration of SC and modified PDW as the 2 stage model (Emery M, 1999). We similarly finalized a design process that yields Unique Designs for any situation requiring something other than planning, policy making or organizational (re)design (Emery & deGuerre, 2007). At the same time Peter Aughton was taking the lead on exploring ecosystem design so eventually we had a full suite of processes and methods to address any idea or solve any problem that arose (Emery M, 1999).

Both sides of the original Emery-Trist research, the conceptualization of the open system and the birth of sociotechnical systems, later revolving around the design principles, had thoroughly merged to become one comprehensive, all encompassing conceptual framework, open systems theory, OST. This completed the language change in Table 1.

The consequences of the time warp

By ignoring all the new developments in STS during the warp period, the case presented as an example of DSTS is an unnecessarily, and astronomically expensive and time consuming exercise. But the problems are larger and deeper than that.

The purpose of this exercise is described as to incorporate a "digital platform to more effectively meet the needs of the home dialysis patient and others in the work system" (p12). As such, it would never have been the subject of a traditional STS design. The one and only purpose of STS was to produce work fit for human beings, to fulfil human needs as defined by the psychological requirements for productive work, for those who worked in an organization (Emery & Thorsrud, 1969), not its patients or customers, only those with structural relations to the organization. Or, in the modern terminology, it is a change of design principle. That was its sole purpose, it was never to plan or design around patient centred care or anything like it.

So at the heart of this paper is a colossal mistake, a total misinterpretation of the purpose of STS.

The authors correctly claim that that the two elements of their approach to design involve:

1. integrating the design of the digital technology and the social system at the ecosystem level, and
2. multistakeholder participation

And we agree with them. However, STS in old or new form is a long way from being the correct methodology as we have seen, and as far back as the early 1960s, the task would have been recognized as requiring a Search Conference and that is what would have been used.

One of the flowons from this mistake was the wasteful, costly analyses of variances. As its purpose rendered it suitable for a Search Conference, not a sociotechnical analysis and design, old or new, *no analysis of variance was required*.

In some cases where there is a highly complex technological system, participants may spend some time on this system to ensure it is working effectively or as required but they have never needed to do a variance analysis. If it becomes obvious that a change of design principle is required, a PDW will be added to achieve that.

That the authors of this paper understood so little about STS, old or new, is illustrated by their statement on p3, namely, "organizational redesigns will no longer be onetime events. There will be a need to continuously evolve the technical and social design as technical changes enable new business models and ways of doing work that present market challenges and opportunities". They clearly do not understand that when responsibility for coordination and control is put in the hands of the people doing the work, they take the bit between their teeth and start to make all sorts of improvements and innovations. I can remember Don deGuerre saying that after the original redesigns at Syncrude Canada (SCL), the changes came so thick and fast that it was impossible to draw up an organizational structure that wouldn't be out of date by tomorrow. That is a common experience.

One of the huge ironies in this paper is the author's belief that the socio part of organizational systems is not being fully addressed – they are totally correct if they are referring to the USA. All the authors of these time warp papers are American and one of the reasons the 'socio part' is not being addressed is precisely because they have studiously ignored the design principles for many years. The USA seems wedded to its structures of hierarchical dominance and notions of control. They have far less understanding of the needs of coordination and cooperation which is one of the reasons Agile was never going to work.

The case Satellite Health

The case around which Winby & Mohrman write their paper is Satellite Health, also discussed by Baburoglu & Selski (2022). The criticisms I made of that (Emery, 2022) still hold now. There is absolutely nothing in the case or its treatment that could possible justify a brand new name and a claim to a brand new method. It is not at all unusual for a Search

Conference to plan for and implement new technologies of any form. That has been happening since the method was created and developed, for example, the BAE146 which eventually resulted from the first Search (1959) and a new road and traffic system which came out of the Geelong Search in 1974. These days, when the results of Search indicate that a new organization needs to be created to implement the plans or continue with the design work, the method will shift from being a Search Conference to a two stage model so the very best structure and conditions will be in place for successful and sustainable implementation.

Similarly, when an organization is structured on DP2, new technologies are easily introduced and often the people who work there, as above innovate their own custom designing to suit their own circumstances and purposes.

That Winby & Mohrman can claim "Existing organizational design frameworks do not adequately address the new reality where both the technical and social elements of the full ecosystem need to be designed" (abstract) is nothing more than an admission that they are suffering from the time warp they have helped to create.

One of the claims made for a dramatic new reality is that because of digital technology, organizations can consist of many more independent operators or consultants. That is true, there has been a trend towards hiring consultants as it is usually considered a way to reduce costs. However, the relationships between organization and independent consultant also fall into only one of the three options, DP1, DP2 or Laissez-faire (LF). Whichever it is will determine how that relationship will work over time. And if that relationship is not carefully governed by either of the design principles, it is worth remembering the devastating result of LF in the classical experiments carried out between 1938 and 1940 (Lippitt & White, 1943).

During the time warp: East Grampians Health Service

As a contrast to the wildly complicated and expensive case of Satellite Health, let us look at just one example using modern concepts and methods; a Search Conference (SC) for the East Grampians Health Service (Aughton & Konarik, 1996).

This health service provides community health to the Victorian town of Ararat and its surrounding region. At the time, the health system was rapidly shifting away from keeping people in hospital, the place from which the bulk of health care had been traditionally administered and carried out. The strategic plan had to be relevant, therefore, to the community, the changing social environment and changes emerging in the health industry.

The SC was designed to engage the whole community with participants from the board, senior managers and key players from the community using all previous intelligence from a series of focus groups. Preparation for it included some focus groups with former psychiatric patients now living in Ararat.

After two days and two nights of intensive creative work identifying and analyzing the most influential trends in the global social environment, Ararat and its surrounding areas and the health system, they arrived at the following 5 year strategic goals:

1. "to increase the number of people EGHS is able to treat in this community and in their own environment
2. to increase the community's awareness of the services EGHS provides and ensure easy access to these services
3. to promote cooperation and build alliances between EGHS and other health and non-health service providers to improve the level of service delivery and reduce duplication
4. to provide a quality, innovative, effective and efficient Health Service which is able to respond to increasing demands from all levels of government and the community
5. to ensure the Health Service provides suitable facilities to meet community needs and changing Federal and State Government policies".

One of their creative ideas to meet their strategic goals was the 'hospital in the home'. This initiative resulted in EGHS acquiring a small bus with appropriate medical equipment that could take EGHS service to people's homes. It was an idea taken up by other communities.

Overall the SC was such a success, it was mentioned in the Victorian parliament. Since then EGHS has gone from strength to strength with multiple campuses and a hugely diverse range of services. Hospital in the home has become a backbone of the service, now called Health@Home.

The EGHS Search shows just how misleading this Winby & Mohrman and similar articles are. With only a small fraction of the time and resources chewed up in the Satellite Health case, a very similar and extremely positive result was obtained by eliciting all the creativity in local people, and years before the 2018 effort. This is the history of OST methods developed during the warp period.

All this wealth of material and examples was open to Winby, Mohrman and their ilk as all the critical developments during the time warp are published and examples readily available. Moreover, they have been taught over there in seminars and workshops as well as conferences. It seems quite futile ignoring the developments in OST as new successful projects of various sorts continue to be published in this vitally important area of organizational design and performance.

Conclusion

One further point needs to be made: whether the researchers choose to ignore or address the design principles and the location of responsibility for coordination and control, ***it will be somewhere***, have no doubts about that. In an organizational structure, coordination and control are the basic inescapable dimensions and those holding responsibility for them will continue to exercise the well known consequences. No amount of wishing them away, refusing to discuss them or calling them different names as we see in Agile makes any difference to their effects (Emery, 2023). Satellite Health's website portrays it as working well which is wonderful. However, its senior management is a classical DP1 structure and while it is to be hoped that its practicing health professionals are genuinely working cooperatively, it is described as being 'practitioner led' which in health care, usually means the doctors are the bosses. Unfortunately, this can mean that the system is inherently unstable and could run into problems at any time. Until responsibility for coordination and control is vested in self managing groups, this risk will remain.

So it looks as if after all that unnecessarily expensive work, *they didn't even manage to change the design principle* which was the goal of the old sociotech method anyway. So the whole thing was a double failure.

Those who like Winby & Mohrman, choose to ignore modern OST are obviously doing their clients, and their readers, a disservice. In reality, there is no time warp and whatever purpose creating it is serving in the minds of the creators, it lacks credibility as well as providing what we could politely describe as a second class service.

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