

Designing Democratic Dialogue into Medical Practice

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Abstract

Sociotechnical systems design has encouraged practices that allow developers and users to construct software applications together. A further level of sociotechnical practice would be an ongoing process within the interface of the software itself addressing three spheres: the formal data system, the patient's view, and the combined doctor-patient view. We have used Habermas's concepts of system, lifeworld, and public sphere to characterize the world of formal medical records, patient personal information and ideas, and the consultation space itself. Using Habermas's scheme identifies an area that is overlooked in traditional sociotechnical systems design, the public sphere and its rational equality, or democratic dialogue. The model we developed from Habermas addresses the individual as lifeworld, the technical/formal records administration as system, and the consultation space as the heretofore poorly defined public sphere, with its specific discourse conventions.

Keywords 1

Sociotechnical design, Critical Theory, Habermas, Democratic dialogue, Healthcare

1. Introduction

Sociotechnical systems design has encouraged practices that allow developers and users to construct software applications together. Often these are design sessions where both parties contribute, and developers execute the design. They may be followed by iterative sessions, or changes may be made during maintenance efforts [1]. What we have not seen yet is the design of sociotechnical practice as an ongoing process within the interface of the software itself addressing the three spheres: the formal data system, the patient's view, and the combined doctor-patient view. Taxén [2] has addressed this division in another way. He claims that sociotechnical systems practice tends to perceive two elements, a technical system, and a social system, but leaves out the individual. In use, the individual needs a place to exercise agency, which would be in what we call the public sphere.

This is especially relevant to the emerging changes in healthcare practice, known as “flipped healthcare”, referring to the fact that patients increasingly bring data and information from apps and platforms from outside the healthcare context to their consultations [3]. Problems accompany this shift: as roles change and doctors become “equal partners”, contradictions are introduced. Neither doctors nor patients have a firm grasp on how to enact these roles. A case in point is the question of information security and how to manage the unvetted data that patients bring from social media into the practice setting, while for their part, doctors are invited to contribute on public platforms [4, 5].

Prior studies have shown that there is potential for increased patient engagement and shared decision-making when parts of the care process are digitalized [3, 6]. Electronic health records (EHR) have become a third presence in primary care visits over the last decades. Besides teaching physicians how to use current functionalities including screen sharing, EHR programs could be designed to include patient-centric features [7]. Integrating eHealth and traditional care into blended care offers a way to support patients and enable shared decision-making as a form of patient-centered care [8, 9]. However, the new role of patients as co-producers in “flipped healthcare” poses a disruption to providers who must negotiate new relationship boundaries with patients. The electronic environment currently

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accommodates what we call system and a physician-mediated lifeworld, with public sphere left tacit, creating ambiguity for practitioners [5, see also 10], who must devise individual strategies to manage responsibilities regarding patient disclosures and patient data, according to how they see their roles. Some lean towards system accountability, and others towards lifeworld accommodation (see Table 1).

Habermas [11] defined the system as the state and its authority, top-down and closed. The lifeworld comprises the family and close friends and includes emotion, personal relations, and disclosures that stay within the group. Public sphere is the domain of intellectuals, originally arising in the 1700s Enlightenment that comprises a separate area of discourse based on rationality and equality, described as democratic dialogue. This has relevance in context of democratization of healthcare. We have used

Habermas's concepts of system, lifeworld, and public sphere to characterize the world of formal medical records, patient personal information and ideas, and the consultation space itself, respectively.

This would define the doctor-patient consultative relationship as a "public sphere" where democratic dialogue takes place, and certain discourse conventions apply. We suggest a model based on critical and sociotechnical principles for the design of democratic dialogue between patient and provider into medical practice.

Habermas' notion of the public sphere gives us a way to formalize trends in the provider-patient domain and disambiguate the new role relationships. In the scenario proposed here, the sociotechnical system development is not necessarily ever finalized, but is part of an ongoing infrastructuring process [12, 13] where accommodation to patients is hard to design up front, and hard to capture in the physician-patient encounter. Part of the reason it is hard to capture is the less formal nature of patient information inputs, that nevertheless under the new philosophy must be addressed.

2. A sociotechnical approach

Sociotechnical systems and related theories and practices have been identified as the "axis of cohesion" for the IS discipline, that crystallizes the various themes and domains that IS research undertakes [14]. These systems predate the field of IS itself through Mumford's humanistic industrial research at the Tavistock Institute, coming to IS through the Soft Systems Methodology [15] that applies Mumford's research. Until recently, the primary context for this approach has been organizational, where the premise was that the systems had a "human" origin, the technology was designed to support that human purpose, and in order to work best, the design process ought to take into account the intentions and work satisfaction of employees. Sarker, et al. [14] have reflected on differences found in sociotechnical research relating to whether they were more focused on the human or on the technical aspect, and of course, on the primary goals of projects, which tend to focus on the instrumental aspect. Comprehensive sets of methods have also been defined [e.g. 16, 17] to provide coherence to the concept of sociotechnical systems as an approach. A difference must be drawn between human beings/humanism, and organizations/capitalism or other guiding economic and regulatory regimes. That is, the "human" purpose for spending money on a system addressed in classic sociotechnical systems has tended to come from an organization of some kind, and the goals therefore are to meet some organizational need for greater coordination and productivity. This is the case even when the goals themselves are humanitarian, e.g. NGO initiatives driven by outcome goals.

The idea that IS are not mere technical artefacts but result from the interaction among technological artefacts and their users is the bedrock upon which the humanistic paradigm in IS research has developed, since information systems do not exist outside of some human context. Sarker, et al. [14] link the sociotechnical framework to structuration and to sociomateriality, referring to the "constitutional entanglement" of social and technical systems as described by Orlikowski [18, p.1444] and others. In short, it makes no sense to conceive of a standalone technical system independent of its social purpose and use, or to think of them as in any way separate.

Recent developments have taken IS research outside of organizational boundaries into domains where private and public systems interact, and where often low budget third parties create software to run on those platforms. Instead of a basic stakeholder set comprised of labor and management (embodied as the technical developers, and as an accessory, customers), we have aggregative systems. For the platforms era, scholars have argued for a concept of emergent digital design that transcends

organizational boundaries and emphasizes concepts like emergence, networks, and ecosystems, abandoning the traditional focus on individual organizations as stable units of analysis in IS research and focusing on new sociotechnical phenomena that include service ecosystems and service platforms [19, and others]. Kallinikos [20] has aptly summarized the situation. He claims the idea that technology is locally negotiable (i.e. sociotechnical) overlooks key elements of the “objectification” created and accumulated in those technologies. This understanding focuses on the user-centric aspect, which is only a small part of the overall environment: “Technological systems, though, involve a large array of technical and organizational factors that may not be apparent at the level at which humans operate or come into contact with technology.” (p. 246) The funding, design and control of the medium decide where the power is by default. Users do exercise control both individually and collectively in the process of tailoring the available technologies to their own uses. Done collectively this is described as infrastructuring [12], where systems never exactly match the needs, but are now open enough to be adapted [21]. Thus, we find challenges to earlier sociotechnical constructs both in theory, as to where the power lies, and in the disruption provided by porous organizational boundaries of information use. While sociotechnical systems as traditionally conceived are inclusive in terms of who has input into a system, they are not necessarily “critical” in terms of who has power in an organization or power over a technical system design.

2.1. Sociotechnical design and critical theory

To address the gaps above, we draw on Habermas’ concept of the public sphere, which is part of his general Critical Theory approach. Habermas’s notion of democratic dialogue is a core tenet of sociotechnical systems as regards the design process. Democratic dialogue is a property of what Habermas posits as a “reasoning public” that discusses the issues of the time, independent of direct economic interests and in benefit of the common good. He contrasts the public sphere with the spheres of the system and the lifeworld. As outline above, the system is the state or other controlling entity. It holds power, and its decisions are top-down. In the current context, part of the power of the political or organizational system is the codification of procedures into the rules embodied in technical systems. In the healthcare setting, those data systems are heavily regulated, closely guarded, have limited access, and can be modified only by persons the system has authorized. At the other end of the spectrum is the patient’s lifeworld, comprised of the patient’s own experience, attitudes, information from peers, social media, and Internet searches, and data gathered from their devices. This information is infused with cultural and psychological predispositions, varies in validity, and is not particularly well organized. Thus, its persuasive or decision-making power is limited. We characterize the intermediate sphere in Habermas’s terms as the public sphere. While on public discussion groups this sphere is currently degraded with disinformation and confrontational behavior, the concept that Habermas put forward is still the rhetorical practice among professionals and academics. That is, participants are on an equal footing and rely on shared logic, validity tests, and linguistic habits. We propose to create this sphere in the equalized clinical environment where physicians can negotiate the validity and utility of patient lifeworld information rather than rely entirely on the system and conventions of practice, which favor the authority of the physician.

As an example of how power assumptions can drive medical systems, early medical records systems took a hierarchical view of usage, making the doctor’s access the landing page or point of entry, even though their information access is less frequent and more summary. Research revealed that the most frequent and detailed users were nurses [22-25]. The simple switch of making the landing page of a patient record nurse-oriented information was conceived from these studies. Social assumptions like this, based on both hierarchy and gender, were exercised across the board in the design of systems before user studies were performed.

If the hope is to loosen the structure of power around authoritative knowledge [26, 27] in the medical setting, then the notion of sociotechnical systems needs to include this intermediary negotiative component. For patients to participate effectively in medical systems, there must be a notion of relative power and a specific locus for equality to be realized in the technology. The power in question is the ability to have patient concerns and information seen on an equal footing rather than subordinated to medical authority as described by Kallinikos and Tempini [26]:

In either a case study or a randomized control trial (RCT), the patient shares and discusses the situation *in situ* with a clinician (nurse or physician). Only through this negotiation can a symptom become a legitimate, recognized fact. A symptom officially enters an information system as data only by the hand of an expert. By controlling data entry, clinicians have the ultimate word on what a symptom really is. The patient plays a dependent role in data collection, and only so far as perceptions and feelings are part of the phenomena under investigation, such as when reporting symptoms. The patient is otherwise excluded from the assessment of all other reportable and observable medical entities (clinical signs) and has no relevant role to play in measurement, nor in inference. (p.7)

As we shall see, current trends already push against this authority, but in order to be effective they must be realized in a space dedicated to more formalized sharing and negotiation. Critical Theory provides a template for this.

While Critical Theory has not been dominant in sociotechnical literature, it has informed a segment of IS since the 1980s [28-30] with reference to workplace democracy, the Scandinavian School, and aspects of sociotechnical systems and Soft Systems [15, 31, 32]. Shaw and Stahl [33] describe the debate about what counts as critical research:

The distinguishing feature of critical theory is its intention to promote emancipation (Horkheimer, 1970), which can also be applied in information systems-related research (Howcroft & Trauth, 2005). The emancipatory agenda draws attention to...the pathologies of capitalism and establishes a link between critical research and ethics (Stahl, 2008) (p. 262).

Richardson and Robinson [c.f. 34] provide further discussion. As noted by Janson and Cecez-Kecmanovic [35], although one could not claim that the application of Habermas' Critical Theory in IS has been extensive, its influence has been disproportionately significant. The emancipatory agenda differentiates Critical IS research from other research paradigms, such as positivism and interpretivism. It uses an ethical posture to empower and emancipate [36]. The first step in this is to acknowledge the power differential implied in the capability to build infrastructures as opposed to helping design or providing usability input to them. Relating to Habermasian distinctions, we see an opportunity to articulate three distinct domains each with its own power attributes and epistemic conventions. The use of those distinctions allows us to address a gray area where the new agenda for patient empowerment is not reflected to date in any formalized system but consists of unprocessed or partially included information. The intent to democratize patient care is highly constrained at the practice level [5] simply because it is not reflected in the technical system.

2.2. Sociotechnical and Critical Design applied to Healthcare

Shaw and Stahl [33] assert that it is essential to identify hidden assumptions and ideologies in order to provide a better understanding of the inner workings of socio-technical systems, with a view to improving them:

Health informatics should address these issues from a sound conceptual base, such as might be provided by critical theory, which seeks to identify hidden assumptions and ideologies. This discipline can provide a better understanding of the inner workings of socio-technical systems, with a view to improving them through the promotion of emancipation (allowing people to fulfill their potential). (p. 255)

In the case of healthcare, those systems now comprise the institution and its administrative requirements and formal patient records, "labor" in the form of medical professionals, and "customers" in the form

of patients. Each of these three segments is a quasi-independent system that interlocks with the other two systems. The institutional system is well-defined, regulated, and controlled. The professional system interacts with the institutional system but ad hoc features have been introduced because of new patient philosophies, and the patient system has emerged as a collection of unregulated unverifiable inputs reflecting various sources patients have access to by means referred to above, e.g. Internet searches, social media, and health data gathered from personal apps and devices [26]. These information sources need a place to intersect if the patient is to have the agency that flipped healthcare intends.

Some degree of emancipatory agenda with regard to patient information has been achieved in exploratory settings, supporting the notion that the patient lifeworld and curated information can become a legitimated information artifact. Kallinikos and Tempini [26] describe an organization that developed a social networking platform to pursue medical research based on data collected from a “distributed, open, user base through patient self-reporting”.

At one end of this research process, there stand, as a kind of raw material, a myriad of patient observations about their life experiences. The final product at the other end is a number of peer-reviewed articles and other scientific publications...Producing medical knowledge through the routine online involvement of patients provides a stark contrast to the complex, expert-dominated, prestige-laden, and costly institutional arrangements characteristic of medical research. (p.2)

The prior inequality of patients becomes apparent in part through the changing circumstances of care. Institutionally some of this is understandable. Doctors spend many costly years in their education; they make decisions about care that must hold up to serious challenges in court; patient records are subject to strict protections, and so forth--all valid reasons for top-down control. However, the blanket authority of the system can be challenged as to accuracy of decisions, costs of care, and patient rights to choose. The medical systems have also lost control as information gatekeepers when a combination of authoritative and informal information sources, patient symptom boards and sharing, personal diagnostic devices, and a host of platform-enabled changes prepare the patient to participate in their own diagnosis and care programs. Current research in Sweden [5] on how practitioners deal with these changes reveals many contradictions. Both patients and practitioners vary in how they deal with the contradictions (see Table 1 below). But across the board, the changes are negotiated ad hoc on a patient-by-patient, practitioner-by-practitioner basis, according to their preferences, and without clear guidelines. In particular, we assert here that in order for the patient's view, their lifeworld, to become part of the official record, it needs an official place to be recorded by the patients. Since it is not a formal record yet, it cannot become part of the system. If there is no record of the practice encounter, then it is still the practitioner who has the authoritative memory of what was discussed and decided, per Kallinikos and Tempini cited above. So, in a sociotechnical context, the patient needs a technical presence even for information that is temporary or under negotiation. That is the “public sphere” where patients can engage on an equal footing with the practitioner. Thus, Critical Theory and its democratic dialogue in a medical system require a designated space.

Physicians in studies by Vallo Hult and others [3,4] have expressed ambiguity about their accommodation of patient autonomy in light of their responsibility, and their degrees of concern about patient security and privacy, given the lack of clear boundaries. Both patients and physicians vary in their preferences and orientations to “authoritative” knowledge. Table 1. Illustrates this divide.

Patient characteristic (autonomy/rationality)	Provider approach (power/risk)
Lifeworld-friendly	
<u>High autonomy/High rationality</u> <i>Patient demonstrates special knowledge with illness, convinces physician.</i>	<u>Low Power/Risk tolerant</u> <i>Physician incorporates patient data in treatment plan and learns from it.</i>
<u>High autonomy/Low rationality</u> <i>Patient is misinformed, needs reassurance about groundless issues.</i>	<u>Low Power/Risk tolerant</u> <i>Physician takes guiding role, assists patient to seek better information for themselves.</i>
System-friendly	
<u>Low autonomy/High rationality</u> <i>Patient is unable to convince physician that alternative information is valid.</i>	<u>High power/Risk averse</u> <i>Physician takes gatekeeper role, advises patient on conventional medicine and clinical evidence.</i>
<u>Low autonomy/Low rationality</u> <i>Patient is unfamiliar with/incurious about disease and gives all authority to provider.</i>	<u>High power/Risk averse</u> <i>Physician recommends treatment plans based on standard medical care.</i>

Table 1. Provider and patient orientations to system and lifeworld [5]

3. Sociotechnical design for democratic dialogue in flipped healthcare

To give patients more power, an explicit format should exist for dialogue to take place; we suggest a user interface where all three of these domains coexist but are separately structured and secured. This would establish a public sphere as a collaborative space guided by rationality and equality, separate from the formal, authoritarian construct of the system and the impressionistic, emotion-tinged lifeworld of the patient. In current practice, both doctor and patient can forget details of the dialogue that took place, including the questions to cover, each recalling what stood out for them but missing details and logical links. It is easy for the patient to accede to the doctor’s opinion without absorbing the reasoning, and likewise for doctors to assume they have communicated when they did not. So, the public sphere is more than a collaboration space; it is a record of process. It would allow the reasoning to be revisited by both doctor and patient when key decisions are made. Formal health records with their regulatory and evidence-based constraints would be accessed from the same interface as the informal data the patient has brought, with different protections; and in between these two there is a space that is vetted in the process of physician-patient conversations. For instance, the patient brings information from social media or engages with the doctor on social media, and the doctor vets and discusses this information in the public sphere container. This would provide a unified record of information offered, counter-information or consideration from the doctor, and an abstraction of the resulting understanding. This could then become part of the patient record, and optionally the formal system record.

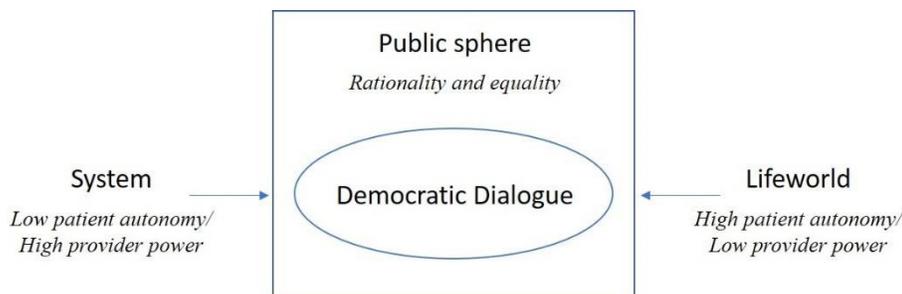


Figure 1. Conceptual model of sociotechnical design for democratic dialogue in flipped healthcare

Without this space, the democratic dialogue that takes place becomes lost, as there is no record of it; given the authoritative knowledge [27] divide, the doctor’s conclusion remains definitive. Although different from Taxén’s observation that individuals are left out of sociotechnical systems, our division parallels the same spheres and identifies a related area that is overlooked in traditional sociotechnical

systems design. Our model from Habermas addresses the individual as lifeworld, the technical as system, and the other space as the now poorly defined public sphere, which resembles the social but has specific discourse conventions.

Elements of the public sphere patient space might include the following: links to external sources, data uploads from devices, edit space for less formal materials, a chat function that can also be used for notes by both parties in the clinical setting, possible semantic analysis engine to trace the steps and outcome of dialogue, decision trees or other tools. At some point, symptom and diagnosis information, once stabilized, can move to the system side by means of the practitioner or data manager. The patient information side is open to the Internet in terms of inputs, though walled off for privacy.

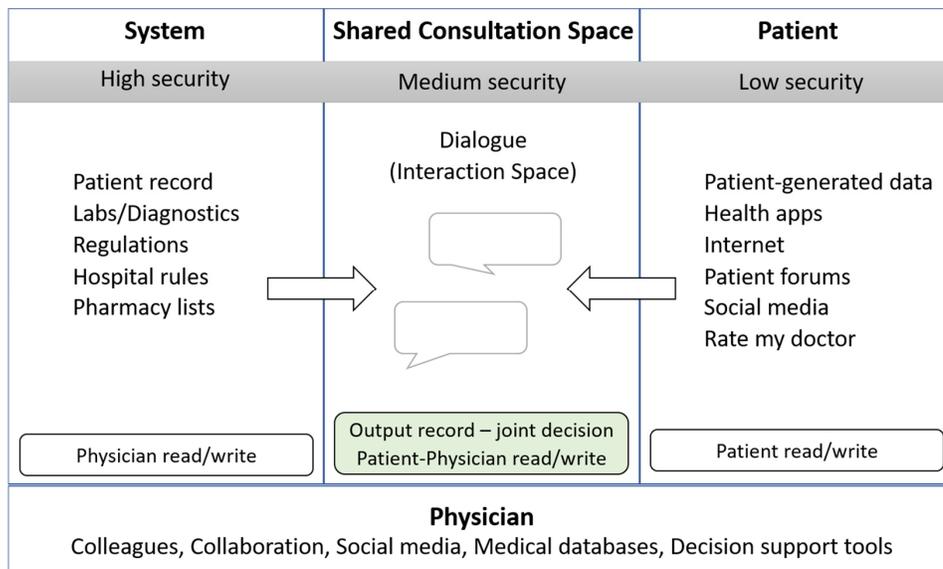


Figure 2. Medical Interface with Shared Space

In the system described by Kallinikos and Tempini [26], this space exists totally outside the clinical system. It is a place where the patient can share with people who have similar symptoms, enter and control their own data, and build up a longitudinal case for themselves. This kind of external system could also be an input to a clinically based system where the patient has a space of dialogue with the practitioner, or even their own compartment for data collection. The key to the equality aspect in either case is the formalization of data collected by the patient into a recognized medical artifact.

4. Conclusion

A review of sociotechnical principles and basic principles of Critical Theory show applicability to a new context of healthcare delivery that puts patients on an equal footing to bring information and preferences into the clinical setting as a part of care decisions. We address this concern because, if we are going to think in sociotechnical terms, there is a missing technical component in the new care setting, and that is a place for patient information to be provided and negotiated, and then become part of the patient record. We have named this the public sphere, after Habermas's notion of an egalitarian space for rational democratic dialogue, as distinct from the power profile of the system or state, and the experiential, partly rational sphere of the patient's lifeworld. This would elevate patient concerns, record them, and make them official inputs into care decisions. While sociotechnical systems research has always emphasized the input of the employee or user of a system, this approach takes in yet another key stakeholder in medical institutions: the patient, who is now more than someone to be acted upon, but someone also acts.

5. References

- [1] H. Biskup and K. Kautz, "Maintenance: Nothing else but evolution?!", *Information Technology & People*, vol. 6, no. 4, pp. 215-231, 1992.
- [2] L. Taxén, "Reviving the Individual in Sociotechnical Systems Thinking," *Complex Systems Informatics and Modeling Quarterly, CSIMQ*, no. 128, pp. 39-48, 2020.
- [3] H. Vallo Hult, A. Hansson, L. Svensson, and M. Gellerstedt, "Flipped healthcare for better or worse," *Health Informatics Journal*, vol. 25, no. 3, pp. 587-597, 2019.
- [4] H. Vallo Hult and E. Wynn, "Information Integrity and Human Infrastructure in Digital Health Care," presented at the Proceedings of the 25th Americas Conference on Information Systems, Cancún, Mexico, August 15-17, 2019.
- [5] E. Wynn and H. Vallo Hult, "Platforms and the Public Sphere," presented at the Proceedings of the 26th Americas Conference on Information Systems, Salt Lake City, UT, USA Virtual event., 2020.
- [6] A. S. Islind, T. Lindroth, J. Lundin, and G. Steineck, "Shift in translations: Data work with patient-generated health data in clinical practice," *Health Informatics Journal*, vol. 25, no. 3, pp. 577-586, 2019.
- [7] O. Asan, J. Tyszka, and K. E. Fletcher, "Capturing the patients' voices: Planning for patient-centered electronic health record use," *Int. J. Med. Inform.*, vol. 95, pp. 1-7, 2016.
- [8] A. S. Islind *et al.*, "Individualized blended care for patients with colorectal cancer: the patient's view on informational support," *Support Care Cancer*, 2020.
- [9] E. P. W. A. Talboom-Kamp, N. A. Verdijk, M. J. Kasteleyn, M. E. Numans, and N. H. Chavannes, "From chronic disease management to person-centered eHealth; a review on the necessity for blended care," *Clinical eHealth*, vol. 1, no. 1, pp. 3-7, 2018/03/01/ 2018.
- [10] P. M. Bednar, "A contextual integration of individual and organizational learning perspectives as part of IS analysis," *Informing Science*, vol. 3, no. 3, pp. 145-156, 2000.
- [11] J. Habermas, *The Structural Transformation of the Public Sphere*. Cambridge MA: MIT Press, 2007.
- [12] V. Pipek and V. Wulf, "Infrastructuring: Toward an integrated perspective on the design and use of information technology," *Journal of the Association of Information Systems*, vol. 10, no. 5, pp. 447-473, 2009.
- [13] S. L. Star and K. Ruhleder, "Steps toward an ecology of infrastructure: Design and access for large information spaces," *Information systems research*, vol. 7, no. 1, pp. 111-134, 1996.
- [14] S. Sarker, S. Chatterjee, X. Xiao, and A. Elbanna, "The Sociotechnical Axis of Cohesion for the IS Discipline: Its Historical Legacy and its Continued Relevance," *MIS Quarterly*, vol. 43, no. 3, pp. 695-719, 2019.
- [15] P. Checkland, *Systems thinking, systems practice*. Chichester: Wiley, 1981.
- [16] P. M. Bednar and C. Welch, "Socio-Technical Perspectives on Smart Working: Creating Meaningful and Sustainable Systems," *Information Systems Frontiers*, vol. 22, no. 2, pp. 281-298, 2020/04/01 2020.
- [17] P. Bednar and M. Sadok, "Bridging the Gap Between Theory and Practice: Socio-Technical Toolbox," Cham, 2016.
- [18] W. J. Orlikowski, "Sociomaterial practices: Exploring technology at work," *Organization Studies*, vol. 28, no. 9, pp. 1435-1448, 2007.
- [19] C. Ngongoni, S. Grobbelaar, and C. Schutte, "Learning from the Past: Soft Systems Methodology as a Tool for Reflective Innovation Ecosystem Management," presented at the Proceedings of DRUID19, Copenhagen, Denmark., 2019.
- [20] J. Kallinikos, "Farewell to constructivism: Technology and context-embedded action," in *The social study of information and communication technology: Innovation, actors, and contexts*, vol. 140-161, C. Avgerou, C. Ciborra, and F. Land, Eds. Oxford: University Press, 2004, p. 161.

- [21] L. H. Fischer and R. Baskerville, "Socio-Technical Change: The Equilibrium Paradox," presented at the Proceedings of the Twenty-Sixth European Conference on Information Systems (ECIS), June 23–28, 2018., Portsmouth,UK, 2018.
- [22] G. Bjercknes, *Organizational competence in system development : a Scandinavian contribution*. Bromley:: Chartwell-Bratt, 1990.
- [23] T. Bermann and K. Thoresen, "Can networks make an organization?," in *Proceedings of the 1988 ACM conference on Computer-supported cooperative work*, 1988, pp. 153-166: ACM.
- [24] G. Bjercknes and T. Bratteteig, "User participation and democracy: A discussion of Scandinavian research on system development," *Scandinavian Journal of Information Systems*, vol. 7, no. 1, p. 1, 1995.
- [25] G. Bjercknes, P. Ehn, M. Kyng, and K. Nygaard, *Computers and democracy: A Scandinavian challenge*. Gower Pub Co, 1987.
- [26] J. Kallinikos and N. Tempini, "Patient data as medical facts: social media practices as a foundation for medical knowledge creation," *Information Systems Research*, vol. 25, no. 4, pp. 817-833, 2014.
- [27] B. Jordan, "Technology and social interaction: Notes on the achievement of authoritative knowledge in complex settings," *Talent Development & Excellence*, vol. 6, no. 1, pp. 96-132, 2014.
- [28] J. Bansler, "Systems development research in Scandinavia: three theoretical schools," *Scandinavian Journal of Information Systems*, vol. 1, no. 1, pp. 3-20, 1989.
- [29] R. Hirschheim and H. K. Klein, "Four paradigms of information systems development," *Communications of the ACM*, vol. 32, no. 10, pp. 1199-1216, 1989.
- [30] O. K. Ngwenyama, "The Critical Social Theory Approach to Information Systems: Problems and Challenges," in *Information systems research : contemporary approaches & emergent traditions : proceedings of the IFIP TC8/WG 8.2 Working Conference on the Information Systems Research Arena of the 90's Challenges, Perceptions, and Alternative Approaches : Copenhagen, Denmark, 14-16 December 1990*, H. Klein, H.-E. Nissen, and R. A. Hirschheim, Eds. Amsterdam: North-Holland, 1991.
- [31] E. Mumford, "The story of socio-technical design: Reflections on its successes, failures and potential," *Information Systems Journal*, vol. 16, no. 4, pp. 317-342, 2006.
- [32] E. Mumford, R. Hirschheim, G. Fitzgerald, and A. Wood-Harper, *Research methods in information systems*. North-Holland Publishing Co., 1985.
- [33] M. C. Shaw and B. C. Stahl, "On Quality and Communication: The Relevance of Critical Theory to Health Informatics," *Journal of the Association of Information System*, vol. 12, no. 3, pp. 255-273, 2011.
- [34] H. Richardson and B. Robinson, "The mysterious case of the missing paradigm: a review of critical information systems research 1991–2001," *Information Systems Journal*, vol. 17, no. 3, pp. 251-270, 2007.
- [35] M. Janson and D. Cecez-Kecmanovic, "Making sense of e-commerce as social action," *Information Technology & People*, vol. 18, no. 4, pp. 311-342, 2005.
- [36] D. Cecez-Kecmanovic and M. A. Kennan, "The methodological landscape: Information systems and knowledge management," in *Research methods: Information, systems, and contexts*, K. Williamson and G. Johanson, Eds.: Tilde University Press. , 2013, pp. 113-137.