Dialectical Inquiry in Information Systems Research: A Synthesis of Principles

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Abstract

Although dialectical inquiry has been sporadically and selectively applied in the Information Systems (IS) discipline, and premier IS journals increasingly welcome dialectical inquiries, we lack methodological guidance on its application and evaluation, hindering its adoption as an important and valid IS research method. In response, we present a critical analysis of general dialectics literature and 63 extant IS dialectical inquiry publications in 18 journals spanning three decades, revealing that there is a growing and sizeable community of IS researchers using dialectical inquiry explicitly or implicitly to examine how sociotechnical phenomena change. Based on this analysis, we synthesize six principles for dialectical inquiry that are firmly rooted in dialectical philosophy, evidenced in IS publications, clearly distinct from each other, and together comprehensive. As such, our contribution can help IS researchers, reviewers, and editors to extend and solidify their methodological repertoire.

Keywords: Dialectical inquiry, research method, principles, information systems research, sociotechnical phenomena, change, literature synthesis

Introduction

Since its inception, the Information Systems (IS) discipline has been united by a shared interest in sociotechnical phenomena, in which both social and technical components play a substantive and not just incidental role (Sarker et al. 2019). In recent times, these phenomena have progressively revealed their oppositional nature amidst the continuing digitalization of society. Digital platforms, social media, mobile apps, virtual collaboration environments, blockchain, artificial intelligence, and crowdfunding all create exciting opportunities, but also challenges and dilemmas that we only begin to understand. As a result, a sizeable and growing community of IS researchers has drawn on dialectical inquiry to examine how sociotechnical phenomena change, as evidenced by our analysis of 63 IS dialectical inquiry publications from 131 authors in 18 renowned journals spanning three decades. Historically rooted in Hegelian dialectics (Hegel 1817), and more recently introduced in management and organization studies (Benson 1977; Smith & Lewis 2011; Van de Ven & Poole 1995), dialectical inquiry enables development of theories encompassing how the duality and generativity of oppositional forces drive change in sociotechnical phenomena.

However, although our analysis shows that premier IS journals increasingly welcome dialectical inquiries, there has so far been scarce methodological guidance on how to apply and evaluate dialectical inquiry in IS research. In contrast to dialectical inquiry in management and organization studies, where the emphasis is on social change, IS research requires even emphases on the social and technical components of change (Sarker et al. 2019). In the analyzed 63 IS publications, authors have applied dialectical inquiry selectively and sporadically by drawing implicitly or explicitly on dialectical philosophy or by drawing on extant IS publications that use dialectical inquiry. This is a complex intellectual endeavor taking up significant parts of a paper, requiring authors to develop and explain the same methodological principles over and over again by drawing on various sources and adapting them to their own context. Complicating matters, the lack of methodological principles makes it difficult for editors and reviewers to evaluate dialectical inquiry, which

may lead to misunderstanding or rejection of methodologically solid manuscripts. Anecdotally, our own experience as authors suggests that dialectical inquiry can be notoriously hard to explain to editors and reviewers in IS journals. As a result, IS researchers may be reluctant to include dialectical inquiry in their portfolio of active research methods. This raises the question: *What methodological principles of dialectical inquiry can be derived from general dialectics literature and extant IS publications?*

To the best of our knowledge, this paper is the first to propose a methodological foundation for dialectical inquiry in IS research. Through intertwined analyses of general dialectics literature and IS publications that use dialectical inquiry, we synthesize six principles that are firmly rooted in dialectical philosophy, evidenced in IS publications, clearly distinct from each other, and together comprehensive. In this way, our contribution to dialectical inquiry as an IS research method may help researchers, reviewers, and editors in IS and related disciplines to design dialectical inquiries systematically, to articulate and justify their use of dialectical inquiry methodology, to carefully consider and apply the range of available principles, and to evaluate dialectical inquiries appropriately. In addition, we hope that our contribution invites critical reflection to stimulate discourse on dialectical inquiry as an IS research method. Finally, we hope that our contribution helps readers, who do not use dialectical inquiry themselves, to appreciate its nature and its usefulness for revealing insights into contemporary sociotechnical phenomena.

The rest of the paper is structured as follows. We continue with a summary and elaboration of the six proposed principles of dialectical inquiry. Next, we explain our research approach to literature synthesis, followed by an analysis of how the principles have been applied in 63 sampled IS publications in 18 journals. We then explain how our methodological contribution may help IS researchers, reviewers, and editors. We conclude with a summary of the key takeaways of this paper.

Principles

Our synthesis of principles is inspired and guided by previous IS publications that propose principles for applying and evaluating IS research methods, such as interpretive research (Klein & Myers 1999), critical realist research (Wynn & Williams 2012), and action research (Mathiassen et al. 2012). Consistent with these publications, we first present the principles rooted in general literature on dialectical methodology (in this section), followed by the analyses of extant IS dialectical inquiry publications (in section "Analysis") – even though our conceptual developments and literature analyses converged iteratively to the principles summarized in Table 1 and elaborated below.

P1: The Fundamental Principle of Opposition states that sociotechnical phenomena change through oppositional forces. Hence, dialectical inquiry prioritizes opposition over harmony in sociotechnical phenomena.

P2: The Principle of Oppositional Responses states that sociotechnical phenomena change through responses to oppositions. Hence, dialectical inquiry prioritizes negotiated order over established order in sociotechnical phenomena.

P3: The Principle of Oppositional Generativity states that sociotechnical phenomena change when latent oppositions become salient in situated contexts. Hence, dialectical inquiry prioritizes generativity over stagnation in sociotechnical phenomena.

P4: The Principle of Opposition-Response Cycles states that sociotechnical phenomena change iteratively through recursive cycles between oppositions and responses. Hence, dialectical inquiry prioritizes recursive change over episodic change in sociotechnical phenomena.

P5: The Principle of Oppositional Logics states that sociotechnical phenomena change as people construct salient oppositions based on different logics. Hence, dialectical inquiry prioritizes constructed change over prescribed change in sociotechnical phenomena.

P6: The Principle of Historical Transformation states that sociotechnical phenomena change over time as incremental changes accumulate into transformational change. Hence, dialectical inquiry prioritizes accumulated transformation over immediate change in sociotechnical phenomena.

Table 1. Principles of Dialectical Inquiry

Similar to Klein and Myers (1999), our use of the term 'principle' emphasizes that we propose applicable, general insights. The principles are applicable for researchers, reviewers, and editors by summarizing insights that are specific to dialectical inquiry, and that have proven useful in some IS research publications although not necessarily widely applied by IS researchers. The principles are presented in generalized form rather than as 'cookie cutters' for dialectical inquiry, meaning that their application requires creativity and imagination. The use of the principles is not mandatory for dialectical inquiry; rather, it requires careful consideration of which principles to use and combine in each context. In doing so, people should not simply cherry-pick some principles while ignoring others; instead, they should exercise judgement of the distinct, comprehensive, and interdependent principles. Hence, our goal is to make IS researchers, reviewers, and editors aware of the range of principles offered by dialectical inquiry so they can extend and solidify their methodological repertoire for mindful adaptation in specific contexts.

Each principle covers a different aspect of how sociotechnical phenomena change and how dialectical inquiry helps to analyze such change. This threefold focus on the social, technical, and change emphasizes that our dialectical inquiry principles are most suitable for studying the dynamics of change in IS phenomena where both social and technical components play a substantive role.

P1: The Fundamental Principle of Opposition

The Fundamental Principle of Opposition states that sociotechnical phenomena change through oppositional forces – colliding events, pluralistic views, or contradictory values that compete for domination and control (Benson 1977; Poole & Van de Ven 1989). Hence, the fundamental unit of analysis in dialectical inquiry is an opposition, here understood as two or more related opposites, which themselves can be oppositions (Sheep et al. 2017). For instance, in technological renewal during digital transformation (Wimelius et al. 2021) there can be an opposition of 'technology usage' between 'established' and 'renewed' usage. There can also be an opposition of 'renewal practices' between 'deliberate' and 'emergent' renewal. Further, 'technology usage' and 'renewal practices' can themselves be oppositional forces that drive the unfolding of a technological renewal initiative during an organization's digital transformation.

Dialectical inquiry then examines the identity of oppositions and the struggle between their opposites. Here, identity refers to the opposition as a whole and describes how the opposites coexist and relate, whereas struggle emphasizes the forward dynamics of change (Cho et al. 2007; Smith & Lewis 2011; Van de Ven & Poole 1995). Oppositions can have various identities, including (Farjoun 2010; Hargrave & Van de Ven 2017; Putnam et al. 2016; Smith & Lewis 2011):

- *Tension:* related opposites that pull in different directions.
- *Contradiction*: interdependent opposites that negate each other.
- *Dilemma*: equally appealing opposites that come at the expense of one another.
- *Paradox*: mutually reinforcing opposites that seem logical in isolation but absurd together.

Oppositions entail struggles whose outcomes can be (Cameron 1986; Drummond 2008; Newark 2018):

- *Ambivalent*: facing uncertainty over which of several appealing opposites should be chosen.
- *Ironic*: achieving the opposite of the intended outcome, despite working as intended.
- *Absurd*: knowingly committing oneself to a futile course of action – a Sisyphean fate.

These terms are often used colloquially and interchangeably to the point where scholars have criticized the consequential weakening of their meaning, for instance, by referring to anything that is unexpected, surprising, or counterintuitive as 'paradoxical' (Schad et al. 2019). Sometimes, the term 'dialectic' itself is used to describe an opposition of one or several theses and antitheses followed and resolved by a synthesis (Fairhurst & Putnam 2019; Smith & Lewis 2011). Others have argued, more closely in line with classical dialectical philosophy (Hegel 1817; Marx & Engels 1892), that a dialectic encompasses the totality of a socially constructed change process driven by oppositions (Benson 1977) that do not necessarily lead to resolution, but instead sustain perpetual and self-reinforcing change (Carlo et al. 2012). As such, dialectical philosophy cautions against reductionist views, arguing that the parts of a dialectic cannot be separated from the whole (Benson 1977). Overall, we purposefully use 'opposition' to reflect the need for an inclusive concept that encompasses the wide range of oppositional forces that can be studied with dialectical inquiry. We call this principle 'fundamental' because it provides the foundation for other principles to build on.

P2: The Principle of Oppositional Responses

The Principle of Oppositional Responses states that sociotechnical phenomena change through responses to oppositions. As Benson (1977, p. 4) notes, any social order necessarily contains and constitutes through oppositions that enable radical breaks with the established order, shape consciousness and action to change it, and produce crises that establish and enhance possibilities for reconstruction. When people are exposed to an opposition in their situated contexts, they are challenged to respond in a variety of ways that reflect different ways of thinking about the opposition (Hargrave & Van de Ven 2017). Typical responses to oppositions include (Lindgren et al. 2021; Smith & Lewis 2011; Van de Ven & Poole 1995):

- *Suppression:* Ignoring the opposition and remaining oblivious to it.
- *Suspension:* Living with the opposition to see how the struggle between the opposites plays out.
- *Separation:* Preferring one opposite over the other and keeping them separate in time or space.
- *Synthesis:* Creating something new from the opposition by integrating and coalescing its opposites.

A response of suppression implies that people can choose to accept or ignore an opposition (Ford & Ford 1994), where ignoring it may reflect defensiveness or anxiety (Smith & Lewis 2011). Suspension, in contrast, implies that people can choose when to respond, depending on how the struggle between the opposites plays out, as a reflection of wait-and-see thinking (Lindgren et al. 2021; Smith & Lewis 2011). A response of separation implies that confrontation between parties is possible when an opposition is framed in either-or terms (Jarzabkowski et al. 2013; Lindgren et al. 2021). Separation is typically a way to deal with acute conflict in the short term, reflecting a need for consistency (Smith & Lewis 2011). In contrast, a response of synthesis is invoked when the opposites are framed in both-and terms and seen as necessary and complementary (Farjoun 2010). When synergies between the opposites can be identified, interactions among the opposites enable opportunities for creative integration and coalescence (Smith & Lewis 2011).

In this way, dialectical inquiry builds on the premise that change is driven by the struggle involved in oppositions (Ford & Ford 1994; Tilson et al. 2010). In some cases, people accept the oppositions they face and work towards synergies to produce mutually advantageous outcomes; in other cases, people respond antagonistically without resolving the oppositions (Hargrave & Van de Ven 2017; Smith & Lewis 2011). Hence, to account for the perpetual interplay between oppositions and responses, dialectical inquiry prioritizes negotiated order – the ongoing emergence of order in sociotechnical phenomena as people experience and respond to oppositions in situated contexts – over established order (Benson 1977).

P3: The Principle of Oppositional Generativity

The Principle of Oppositional Generativity states that sociotechnical phenomena change when latent oppositions become salient in situated contexts. Oppositions are socially constructed and their opposites are embedded in artifacts, practices, and interpretations (Benson 1977; Hargrave & Van de Ven 2017). Hence, oppositions can have two states (Benson 1977; Poole & Van de Ven 1989; Sabherwal & Newman 2003; Smith & Lewis 2011):

- *Latent:* The opposition is abstract and embedded in sociotechnical phenomena, but unperceived by people until change accentuates its opposites, at which point it becomes salient.
- *Salient:* The opposition is concrete and experienced by people, leading to dialogue, debate, or conflict during a particular episode of struggle of the underlying latent opposition.

Oppositional generativity then refers to the capacity of latent oppositions to generate change as they become salient. Latent oppositions exist because sociotechnical phenomena involve distinctions that are nevertheless interdependent (Smith & Lewis 2011). For example, strategies of exploitation and exploration are distinct, but they are also interrelated as exploration contains the seeds for exploitation and vice versa (Farjoun 2010). Thus, latent oppositions are inherent to sociotechnical phenomena, and their manifestation produces different salient oppositions across space and time (Benson 1977). People can remain oblivious to latent oppositions, but if people experience them in some way so they become salient, they will challenge the coherence and integrity of a sociotechnical phenomenon (Lindgren et al. 2021). As such, salient oppositions are manifestations of underlying latent oppositions in situated contexts (Hargrave & Van de Ven 2017; Sabherwal & Newman 2003). Although different salient oppositions may be similar in that they manifested from the same latent opposition, they can have different manifestations depending on the context in which people experience them (Poole & Van de Ven 1989; Smith & Lewis 2011).

In this way, dialectical inquiry enables researchers to empirically examine salient oppositions, to subsequently conceptualize and generalize the underlying latent opposition, and to explain how and why salient oppositions may manifest and persist in situated contexts (Lindgren et al. 2021). Instead of striving for stability, looking for salient oppositions and using them in creative ways offers an opportunity to develop theories that capitalize on oppositional generativity (Hargrave & Van de Ven 2017; Van de Ven & Poole 1995). Hence, by directing attention to how change occurs when salient oppositions manifest (Henfridsson & Bygstad 2013; Mingers & Standing 2017; Wynn & Williams 2012), dialectical inquiry prioritizes generativity over stagnation in sociotechnical phenomena (Erikson & Erikson 1981).

P4: The Principle of Opposition-Response Cycles

The Principle of Opposition-Response Cycles states that sociotechnical phenomena change iteratively through recursive cycles between oppositions and responses. Oppositions provide a continuing source of conflict that, once brought into being, challenges the apparent coherence and integrity of the established order, thereby triggering various responses (Benson 1977; Smith & Lewis 2011). Given such relational understanding of sociotechnical phenomena, in which oppositions and their responses are intrinsically related, responses lead to recurrent manifestations of salient oppositions, forming self-sustaining and perpetual opposition-response cycles (Jarzabkowski et al. 2013). These cycles can be (Smith & Lewis 2011):

- *Vicious:* Stemming from responses of suppression, reflecting anxiety, defensiveness, and inertia, resulting in a single-focused, short-term pathology without embracing ethics or alternative views.
- *Virtuous:* Stemming from responses of synthesis, reflecting equanimity and complexity, resulting in sensemaking, consideration of both-and possibilities, and oppositional thinking.

In each cycle, latent oppositions become salient by contextual triggers such as change, plurality, and scarcity (Smith & Lewis 2011), and by people's adoption of oppositional frames (Lindgren et al. 2021; Sheep et al. 2017). Once a salient opposition has manifested, a response of suppression based in anxiety or defensiveness increases the likelihood that vicious cycles of confusion and inertia are set in motion (Lindgren et al. 2021; Smith & Lewis 2011). In contrast, a response of synergy recognizes oppositions as a natural condition, drawing on the relationship between the opposites to identify a productive response and increasing the likelihood of a virtuous cycle (Sheep et al. 2017; Smith & Lewis 2011).

In this way, dialectical inquiry builds on the premise that opposition-response cycles cannot be resolved once and for all (Jarzabkowski et al. 2013). Instead, the recurrence of oppositions provokes responses over and over again, rendering equilibria temporary at best (Lindgren et al. 2021; Smith & Lewis 2011). In some cases, the underlying latent opposition may change, for instance due to changes in social order or context; in other cases, the responses may change, for instance due to improved ability to embrace recurrent oppositions productively; either way, the opposition-response cycles persist (Benson 1977; Smith & Lewis 2011). Given this processual understanding of sociotechnical phenomena, opposition-response cycles emerge continuously as people respond to salient oppositions, resulting in new salient oppositions (Poole & Van de Ven 1989; Putnam et al. 2016; Smith & Lewis 2011). Hence, dialectical inquiry prioritizes recursive change over episodic change in sociotechnical phenomena (Benson 1977; Smith & Lewis 2011).

P5: The Principle of Oppositional Logics

The Principle of Oppositional Logics states that sociotechnical phenomena change as people construct salient oppositions based on different logics. Dialectical inquiry builds on the premise that a sociotechnical phenomenon is a "unity of opposites" (Sherman 1976, p. 62), in which oppositional logics jointly create a totality (Benson 1977). Oppositional logics can be (Bosserman 1995; Hegel 1817):

- *Polarizing:* Differences concurrently pull opposites apart and bring them together, resulting either in the destruction of the whole or in creating a synthesis, like spouses in marital conflict.
- *Complementary:* Each opposite is needed for a joint outcome, like male and female complement each other in reproduction.
- *Mutually implicating:* The opposites are intrinsically related and imply one another, like family implies relatives and relatives imply family.

Dialectical inquiry then zooms in on the discursive micro-processes in which people socially construct oppositions (Jarzabkowski et al. 2013). Polarization reflects an either-or logic grounded in dualism where

one opposite negates the other, thus provoking responses of separation in which people prefer one opposite over another (Lindgren et al. 2021). In contrast, complementarity reflects a both-and logic grounded in duality where the opposites support one another, as both are needed for a desired outcome (Farjoun 2010). Framing an opposition as complementary thus provokes integrative and synergistic responses (Lindgren et al. 2021; Putnam et al. 2016). Finally, mutuality frames an opposition as constitutively entangled such that the opposites define one another, and neither can exist without the other; they are inseparable, emerge together, and increasing the value of one opposite simultaneously increases the value of the other (Carlo et al. 2012; Hanseth et al. 2006).

In this way, dialectical inquiry builds on the premise that salient oppositions are socially constructed – they are produced and maintained through situated action based on different logics and influenced by people's histories, interests, agendas, environmental constraints, and power bases (Benson 1977; Carlo et al. 2012; Robey et al. 2003). Hence, dialectical inquiry prioritizes constructed over prescribed change in sociotechnical phenomena (Van de Ven & Poole 1995).

P6: The Principle of Historical Transformation

The Principle of Historical Transformation states that sociotechnical phenomena change over time as incremental changes accumulate into transformational change. One of Hegel's and Marx's key critiques was that earlier philosophy interpreted society based on the assumption of a universal and unchanging human nature, thus falling short of explaining how and why society changes (Hegel 1817; Marx 1867). In contrast, dialectical philosophy sees society as historically conditioned, like a river looking much the same day after day but constantly flowing and changing year after year until at one point, "when the banks are thoroughly weakened and the rains long and heavy, the river floods, bursts its banks, and may take a new course" (Kay 1948, p. 66). This dialectical view implies that sociotechnical phenomena are "always the same, but always different", much like "one does not step into the same river twice" although it still remains a river for as long as it flows (Pentland et al. 2011, p. 1370).

In dialectical views of history, stability and change arise not by accident or divine intervention, but as a result of classes and generations inheriting and passing on historical conditions produced by the struggle of oppositions (Marx 1867). Hence, stability and change in the established order are conditioned by recurrent oppositions, giving way to multiple plausible futures that are not predetermined, but instead created through choice and action situated in and shaped by historical conditions (Hegel 1817; Marx 1867; Wang et al. 2020). Change can be (Poole & Van de Ven 1989; Putnam et al. 2016; Smith & Lewis 2011):

- *Quantitative*: Conditioned in short-term episodic iterations giving way to incremental change, like water in a kettle increasing in temperature.
- *Qualitative*: Conditioned in long-term evolutionary developments accumulating to radical change, like water transforming into steam at boiling point.
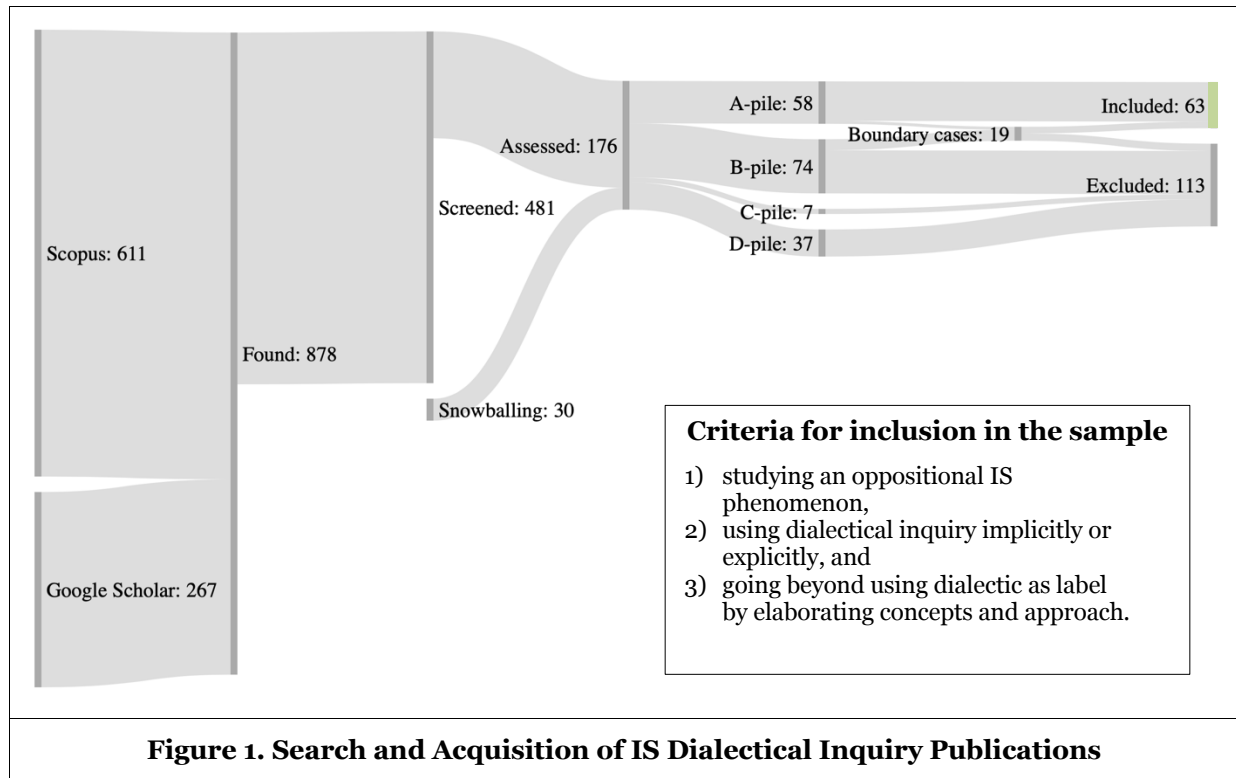
In this way, dialectical inquiry builds on the premise that sociotechnical phenomena are in a continuous state of becoming, rendering any apparent stability as just one among many possibilities emerging from one social order giving way to another (Benson 1977). A sociotechnical phenomenon is then the product of past acts of social construction and may as such be empirically studied and generalized from. However, this is only the beginning of dialectical inquiry, which then continues to investigate the historical transformation through which the phenomenon has been produced and reproduced (Benson 1977). Hence, dialectical inquiry prioritizes accumulated transformation over immediate change in sociotechnical phenomena (Poole & Van de Ven 1989; Putnam et al. 2016; Smith & Lewis 2011).

Methods

The proposed principles are derived from a critical synthesis of classical dialectical philosophy and 63 dialectical inquiry publications in 18 IS journals spanning three decades, from 1991 to 2021. Following Webster and Watson (2002), we describe how we selected and analyzed the considered IS publications. Subsequently, we provide an overview of major findings.

Selecting IS Dialectical Inquiry Publications

We used a hermeneutic approach to iteratively search, acquire, analyze, and synthesize the IS literature (Boell & Cecez-Kecmanovic 2014). Figure 1 illustrates our search and acquisition, as further elaborated below. The ensuing subsection details our approach to analysis and synthesis of the sampled IS literature.

Figure 1. Search and Acquisition of IS Dialectical Inquiry Publications

Criteria for inclusion in the sample

1) studying an oppositional IS phenomenon,
2) using dialectical inquiry implicitly or explicitly, and
3) going beyond using dialectic as label by elaborating concepts and approach.

We considered an inclusive range of 51 renowned journals in IS and related disciplines, based on various journal rankings such as the AIS Senior Scholars' Basket of Eight, top-ranked journals in the Australian Business Deans Council list, the Danish BFI list, and the German VHB list, as well as journals that are likely to publish dialectical inquiries. We searched on Scopus and Google Scholar using the query:

"(Dialectic OR Paradox OR Contradiction OR Tension OR Dilemma OR Duality) AND (Information OR Digital) AND (System OR Technology OR Management OR Organization)"

We read the title, abstract, and keywords of the 878 publications we found to exclude publications that were neither relevant to dialectical inquiry nor to IS. We read the remaining 481 publications more closely and used snowballing and citation pearl growing – that is, considering the literature that is cited in a publication or that cites the publication (Boell & Cecez-Kecmanovic 2014) – to find 30 related publications. This left us with 176 publications, which we assessed in more detail by first sorting them into four piles:

A-pile: 58 publications that study oppositional IS phenomena AND use dialectical inquiry.
B-pile: 74 publications that study oppositional IS phenomena WITHOUT using dialectical inquiry.
C-pile: 7 publications that DO NOT study oppositional IS phenomena BUT use dialectical inquiry.
D-pile: 37 publications that NEITHER study oppositional IS phenomena NOR use dialectical inquiry.

After closer inspection, we excluded all publications in the C-pile and D-pile, because they either focused exclusively on managerial phenomena with no relation to digital technology, or digital technology played only a peripheral role without contributing to the oppositions that were studied. From the A-pile and B-pile, we carefully selected, read, and discussed 19 boundary cases to include publications that implicitly use dialectical inquiry without explicitly calling it such (false negatives) and to exclude publications that explicitly claim to use dialectical inquiry without living up to the claim (false positives). We first discussed four boundary cases from the A-pile to consider whether they should be excluded and seven boundary cases

from the B-pile to consider whether they should be included, leading us to keep all four from the A-pile and to include four from the B-pile. As such, we arrived at the following criteria for inclusion in the sample:

1) studying an oppositional IS phenomenon,
2) using dialectical inquiry implicitly or explicitly, and
3) going beyond dialectic as label by elaborating concepts and approach.

Hence, we included publications that did not explicitly use the term 'dialectics', but nevertheless applied the principles, whereas we excluded papers that used the term, but did not articulate the principles implicitly or explicitly. Based on this logic, we selected further eight boundary cases from the B-pile for discussion, out of which we included only one. We checked both piles once more without identifying further boundary cases that needed discussion, giving us reasonable confidence in our final sample of 63 publications (58 from the A-pile and five from the B-pile) in 18 journals as summarized in Table 2.

Journal	Total Papers	Total Codes	Codes per Paper
Administrative Science Quarterly (ASQ)	1	5	5
MIS Quarterly (MISQ)	3	13	4.33
Organization Science (OS)	3	12	4
Information Systems Frontiers (ISF)	1	4	4
Information and Organization (IO)	6	23	3.83
Journal of Information Technology (JIT)	9	31	3.44
Journal of the Association for Information Systems (JAIS)	6	19	3.16
European Journal of Information Systems (EJIS)	11	33	3
Information Systems Research (ISR)	8	24	3
International Journal of Human-Computer Interaction (IJHCI)	1	3	3
Scandinavian Journal of Information Systems (SJIS)	1	3	3
Information Systems Journal (ISJ)	5	13	2.6
Business & Information Systems Engineering (BISE)	3	7	2.33
Communications of the Association for Information Systems (CAIS)	1	2	2
The Information Society (IS)	1	2	2
Journal of Management Information Systems (JMIS)	1	2	2
Information Technology & People (ITP)	1	1	1
Journal of the Association for Information Science and Technology (JASIST)	1	1	1

Table 2. Dialectical Inquiry Publications in Leading IS Journals.

Most sampled publications are published in a handful of leading IS journals. 63.5% (40) are published in EJIS, JIT, ISR, IO, and JAIS alone. Four other leading journals (ISJ, MISQ, OS, and BISE) published a further fourteen, adding up to a combined 85.7% (54) of publications published in nine journals. Moreover, the frequency of publications has increased significantly over time. The first two decades from 1991 to 2011 comprise 42.9% (27) of the publications, whereas as many papers (27) were published in the five years between 2016 and 2021 alone. Although the number of evidenced dialectical principles is not necessarily a conclusive determinant of quality, publications in premier journals such as ASQ, MISQ, and OS have a higher mean number of evidenced principles per paper. The first two columns in Table 2 indicate the journal and the number of sampled publications. The third column indicates the total number of codes (=number of dialectical principles evidenced across all sampled publications in the journal), as explained in the ensuing section. Finally, the fourth column indicates the mean number of codes per paper (=average number of principles evidenced per publication in the journal).

Analyzing IS Dialectical Inquiry Publications

We used coding to analyze the sampled IS dialectical inquiry publications (Birks et al. 2013; Sarker et al. 2013). Here, a code denotes the evidenced application of a principle in a publication. Seeing codes as abstract descriptions of intersubjective realities that can originate from theory or data (Walsham 2006), we coded the sample in a systematic way to converge iteratively to our theoretical framing of core principles for dialectical inquiry. In doing so, we drew on the general dialectics literature while analyzing the sampled publications in parallel to deepen our theorizing (Gioia et al. 2013).

Initially, based on the dialectics literature we identified three general principles with three sub-principles each, for a total of nine principles of dialectical inquiry. Using these, we then coded a subset of 20 publications from the sample. This gave us valuable insight both into the selection of publications and the articulation of core principles. Over the following two-year period, we then coded and recoded the sample while iteratively revising the principles. In addition, we conducted various workshops and seminars where we obtained feedback on the principles and our coding from dialectics experts in the IS discipline. Through this process, we eventually converged to the six presented principles based on the following criteria for inclusion into the presented theoretical framework, namely that the principles must be grounded in dialectical philosophy, evidenced in the sampled IS publications, and distinct and comprehensive.

Drawing on the six presented principles, both authors eventually coded the full sample of 63 publications independently based on a full reading of the publication. We discussed inconsistencies until 100 percent agreement was achieved and continued to make small and subtle refinements to the principles. The coding of the last dozen publications resulted in no or only marginal changes to our theoretical framing, indicating that we reached the point of theoretical saturation (Birks et al. 2013; Sarker et al. 2013).

Analysis

We now present our analysis of how IS dialectical inquiry publications apply the principles. As mentioned, our inclusive sampling approach means that the application of a principle can be explicitly stated by the authors, or it can be implicitly embedded into their analyses and arguments. For instance, Stein et al. (2015) do not explicitly mention dialectical inquiry as their research method, but do nevertheless present evidence of applying four of the principles. Further, the evidence for application can be based on empirical analyses or theoretical development by authors. For instance, Conboy et al. (2020) provide empirical analyses of six oppositions, from which they develop response concepts as a theoretical synthesis.

Table 3 summarizes our analysis of the publications, indicating which of the principles are applied (columns P1-P6) and sorted from top to bottom by the total number of principles applied (rightmost column). All publications apply at least the Fundamental Principle of Opposition, and all principles are applied by at least six publications. The principles are also sorted from left to right by the number of publications that apply them (bottom row). The more basic principles are more frequently applied than the advanced ones, affirming their logical progression. Finally, no publication applies all six principles and the publications that apply the most principles (5 of 6) are all published in premier journals, affirming that applying the principles is both demanding and helpful for publishing dialectical inquiries in leading IS journals.

Applications of the Fundamental Principle of Opposition (P1)

As the most basic principle, without which a publication would not qualify as a dialectical inquiry, all 63 publications apply P1, albeit in many different ways. Since dialectical inquiry examines change driven by oppositions, application of P1 is a prerequisite for the application of any of the other five principles. Given the oppositional nature of sociotechnical phenomena, P1 has guided IS researchers to analyze core IS phenomena, such as IS development (Bjerknes 1991; Moe et al. 2017; Molnar et al. 2017), IS adoption (Berente & Yoo 2012), IS use (Ciriello et al. 2019; Karjalainen et al. 2019), IS governance (Currie et al. 2018; Lindgren et al. 2021), and knowledge work (Conboy et al. 2020; Wang et al. 2020).

Some publications apply P1 by explicitly framing a sociotechnical phenomenon as oppositional, with reference to dialectics. For instance, Bjerknes (1991), as one of the first IS dialectical inquiry publications, builds on Hegel's and Marx's original concepts of contradiction (Hegel 1817; Marx 1867) to examine 'dialectical reflection' in ISD. Currie et al. (2018) examine 'dialectic tensions in the financial markets' citing Van de Ven and Poole's (1995) process theory of change. Montealegre et al. (2019) examine 'contradictory tensions between exploration and exploitation', citing Smith and Lewis' (2011) concept of paradox and prior IS publications that examine contradictory tensions, including (Hanseth et al. 2006; Tilson et al. 2010). Many recent IS publications apply Smith and Lewis' (2011) concept of paradox, to examine the effects of digital technology (Ciriello et al. 2019), or tensions in agile development (Iivari 2021) and in transformation programs involving digital technology (Gregory et al. 2015). Cho et al. (2007) is an example of a dialectical inquiry that explicitly analyzes identity and struggle of contradictions in the 'dialectics of resilience'.

Publication	Journal	P1	P2	P3	P4	P5	P6	Sum
(Brooks et al. 2020)	JIT	1	1	1	1	1		5
(Karjalainen et al. 2019)	ISR	1	1	1	1	1		5
(Lindgren et al. 2021)	MISQ	1	1	1	1	1		5
(Moe et al. 2017)	EJIS	1	1	1	1	1		5
(Qiu et al. 2017)	ISR	1	1	1	1	1		5
(Sabherwal & Newman 2003)	JIT	1	1	1	1	1		5
(Smith & Besharov 2019)	ASQ	1	1	1	1	1		5
(Yamauchi 2014)	IO	1	1	1	1	1		5
(Boudreau et al. 2014)	IO	1	1	1	1			4
(Carlo et al. 2012)	MISQ	1	1	1		1		4
(Chae & Bloodgood 2006)	IO	1	1	1		1		4
(Gregory et al. 2015)	ISR	1	1	1	1			4
(Mazmanian et al. 2013)	OS	1	1	1	1			4
(Molnar et al. 2017)	JAIS	1	1	1	1			4
(Montealegre et al. 2019)	JAIS	1	1	1	1			4
(Orlikowski & Scott 2021)	IO	1	1	1	1			4
(Pentland et al. 2011)	OS	1	1	1	1			4
(Rahman et al. 2019)	ISF	1	1	1	1			4
(Richardson & Howcroft 2006)	I&O	1	1	1		1		4
(Saravanamuthu 2002)	JIT	1		1		1	1	4
(Stein et al. 2015)	MISQ	1	1	1	1			4
(Weeger et al. 2021)	BISE	1	1	1	1			4
(Wimelius et al. 2021)	ISJ	1	1	1	1			4
(Wiredu & Sørensen 2006)	EJIS	1	1	1		1		4
(Orlikowski 1992)	OS	1	1	1	1			4
(Alvarez 2002)	IO	1	1		1			3
(Bjerknes 1991)	SJIS	1	1	1				3
(Cho et al. 2007)	EJIS	1	1		1			3
(Cho et al. 2008)	JIT	1	1		1			3
(Ciriello et al. 2019)	EJIS	1	1	1				3
(Currie et al. 2018)	JIT	1	1		1			3
(Dobson & Nicholson 2017)	JAIS	1	1	1				3
(Drummond 2008)	JIT	1	1		1			3
(Eaton et al. 2018)	JIT	1	1	1				3
(Karanasios & Allen 2014)	EJIS	1	1	1				3
(Moeini & Rivard 2019)	JAIS	1		1		1		3
(Niemimaa & Niemimaa 2019)	EJIS	1	1		1			3
(Nordheim & Päivärinta 2006)	EJIS	1	1	1				3
(Reimers et al. 2014)	EJIS	1	1				1	3
(Riemer & Johnston 2019)	JIT	1	1				1	3
(Robey & Boudreau 1999)	ISR	1		1		1		3
(Rodon et al. 2011)	ISJ	1	1		1			3
(Soh et al. 2003)	IJHCI	1	1	1				3
(Wang et al. 2020)	JAIS	1		1			1	3
(Berente & Yoo 2012)	ISR	1	1					2
(Conboy et al. 2020)	EJIS	1	1					2
(DeLuca et al. 2008)	JAIS	1	1					2
(Dubé & Robey 2009)	ISJ	1	1					2
(Greenhill & Wilson 2006)	EJIS	1					1	2
(Iivari 2021)	CAIS	1	1					2
(Lee 2016)	IS	1					1	2
(Myers 1995)	ISJ	1	1					2
(Raghu et al. 2001)	ISR	1	1					2
(Robey et al. 2002)	JMIS	1	1					2
(Rodón & Sesé 2010)	EJIS	1	1					2
(Saccol & Reinhard 2006)	JIT	1	1					2
(Salmimaa et al. 2018)	BISE	1	1					2
(Tilson et al. 2010)	ISR	1		1				2
(Zheng et al. 2011)	ISJ	1	1					2
(Beath & Orlikowski 1994)	ISR	1						1
(Danneels & Viaene 2021)	BISE	1						1
(Metcalfe 2002)	ITP	1						1
(Wu 2019)	JASIST	1						1
Sum		63	52	36	26	15	6	

Table 3. Overview of Coded Sample of Dialectical Inquiry Publications

Other publications study oppositional phenomena without explicitly drawing on dialectical inquiry. For instance, Stein et al. (2015) examine in great depth the 'ambivalent affective responses' involved in 'oppositional interactions' with digital technology, building on the concept of ambivalence. Drummond (2008) examines an 'Icarus paradox' of a 'totally destructive system', building on the concept of irony. We frame ambivalence and irony as different forms of oppositional struggle and hence see these analyses as implicit dialectical inquiries, not least because they also apply other principles, as shown in Table 3.

Overall, IS researchers develop oppositional identities and their entailed struggles in different and sometimes interrelated ways, drawing on various sources and applying them creatively to their own context. In this way, our proposed principles and analyses of their application may help researchers to articulate their dialectical inquiries more explicitly and help readers to better appreciate the different forms of dialectical inquiry. We also note that IS publications focus predominantly on oppositions of opposites, but less so on oppositions of oppositions (where the opposites are themselves oppositions, as pointed out by Sheep et al. 2017). Of the 63 IS publications that apply P1, we found only four that analyze how oppositions of oppositions play out over time (Brooks et al. 2020; Lindgren et al. 2021; Qiu et al. 2017; Wimelius et al. 2021), and only one that examined how they play out across space in a situated context (Cho et al. 2007). This suggests that there is an opportunity to utilize P1 more comprehensively in IS research.

Applications of the Principle of Oppositional Responses (P2)

P2 is commonly applied (52 of 63, 82.5%). Almost all empirical publications apply P2, suggesting the description of oppositions and related responses is typical for empirical dialectical inquiry (Lindgren et al. 2021). As with P1, publications can apply P2 by explicitly framing and empirically describing oppositional responses of suppression (Brooks et al. 2020), suspension (Lindgren et al. 2021; Smith & Besharov 2019), separation (Brooks et al. 2020; Sabherwal & Newman 2003), or synthesis (Moe et al. 2017; Niemimaa & Niemimaa 2019); Or, they can apply P2 implicitly by describing such responses with different terms, such as 'compliance' and 'creative solution' (Karjalainen et al. 2019), 'blending' and 'balancing' (Gregory et al. 2015), or 'temporal and procedural loose coupling' (Berente & Yoo 2012). It is also possible to combine empirical description of oppositions with conceptual development of responses. One example is Conboy et al. (2020), who use empirical descriptions of six oppositions in crowdfunding (P1), from which possible responses are synthesized conceptually (P2). In another noteworthy example, Wang et al. (2020) use empirical descriptions of an opposition of knowledge work paradigms (P1) without describing responses, describing instead a historical transformation (P6).

Such examples help to understand and appreciate the nuances of dialectical inquiry, to contrast the various ways in which the principles can be combined, and to elaborate variations for applying specific principles – in this case, the empirical or conceptual description of oppositional responses. Most publications describe only one or two kinds of responses, as in Ciriello et al. (2019), who focus on separation and synthesis. Examples of publications that examine three or more kinds of responses, albeit with different terms than ours, include (Karjalainen et al. 2019; Lindgren et al. 2021). As such, our classification of suppression, suspension, separation, and synthesis as typical kinds of oppositional responses can guide IS researchers to identify different responses and to adapt them to their context.

Applications of the Principle of Oppositional Generativity (P3)

A majority of publications apply P3 (36 of 63, 57.1%). Most of these (31 of 36, 86.1%) also apply P2, for instance, by examining multiple salient oppositions as different manifestations of the same latent opposition (P3), and how these manifestations shape and are shaped by oppositional responses (P2). All papers, except one, that combine P2 and P3 contain empirical descriptions, often using case study methods (Carlo et al. 2012; Lindgren et al. 2021; Moe et al. 2017; Smith & Besharov 2019), ethnographic methods (Niemimaa & Niemimaa 2019; Yamauchi 2014), and in one unusual case social network analysis (Pentland et al. 2011). The one exception is Chae and Bloodgood (2006), who apply both P2 and P3 conceptually. As we have shown with P2 above, P3 is also applied conceptually without applying P2. Examples include Moeini and Rivard's (2019) dialectical review of the project risk management literature, which identifies several salient contradictions from the same underlying contradiction between normative knowledge and experiential knowledge, and, Tilson et al.'s (2010) research commentary on paradoxes and generativity in digital infrastructures.

Identifying application of P3 required careful reading, as the manifestation from latent to salient opposition is often subtle and implicit. In some cases, publications examine the manifestation of salient oppositions from underlying latent oppositions without using these labels, as in Molnar et al. (2017), who examine how 'tensions as roots of improvisation' drive episodic change – in other words, oppositional generativity (P3). In other cases, publications use other labels, as in Rodón and Sesé (2010), who refer to an 'underlying social structure' to describe a 'structural contradiction' as an opposition (P1), but not its generativity (P3). Identifying application of P3 was particularly challenging in Qiu et al. (2017), who present many 'salient tensions' in app development and how the 'logic of the profession' and the opposed 'logic of the markets' manifest in this context. These terms, while very similar to ours in P5, refer to concepts from institutional theory and describe different mechanisms. As such, Qiu et al. (2017) apply P3 by relating their 'salient tensions' to a 'two-way logic synthesis' – which is consistent with our framing of oppositional generativity using different terms. In this way, our principles may help researchers to articulate their examination of oppositional generativity using a shared vocabulary, and to avoid using the same terms for different things or different terms for the same things.

Applications of the Principle of Opposition-Response Cycles (P4)

26 of 63 publications (41.3%) apply P4, which implies application of P2, since one cannot examine cycles between oppositions and responses without examining responses. Compared to other principles, the application of P4 is relatively easy to identify, as its application requires examining the recursive nature of dialectical change through opposition-response cycles. Our sampled publications typically visualize the cycles in a figure presented as the main contribution to a process theory (Boudreau et al. 2014; Brooks et al. 2020; Rodon et al. 2011; Sabherwal & Newman 2003; Smith & Besharov 2019). However, readers and reviewers should be mindful not to equate 'easy to identify' with 'easy to do', as the application of P4 usually requires longitudinal observation, in-depth engagement with an organization, and advanced skills in dialectical inquiry and theorizing. Some studies focus on just one cycle (Karjalainen et al. 2019) while others focus on many (Moe et al. 2017). The considered cycles can span a timeframe ranging from several months (Qiu et al. 2017; Stein et al. 2015) over several years (Boudreau et al. 2014; Wimelius et al. 2021) to several decades (Smith & Besharov 2019). Further, only three publications frame their opposition-response cycles explicitly as either vicious (Carlo et al. 2012; Wimelius et al. 2021) or virtuous (Montealegre et al. 2019), and none identify both vicious and virtuous cycles, suggesting that P4 has so far not been fully utilized.

Applications of the Principle of Oppositional Logics (P5)

Just under a quarter (15 of 63, 23.8%) of publications apply P5. Applying P5 requires applying P3 since examining how salient oppositions manifest necessitates examining the underlying latent opposition from which they manifest. P5 is usually combined with P2 (12 of 15, 80%), since examining oppositional logics enables examining consequential responses (Carlo et al. 2012; Karjalainen et al. 2019; Lindgren et al. 2021).

In their dialectical inquiry, Carlo et al. (2012) examine how the polarizing, complementary, and mutually implicating logics of collective minding can provoke both mindful and mindless appropriations of digital technology. Drawing on the same oppositional logics, Lindgren et al.'s (2021) action research study analyzes the varying construction and consequential management of salient tensions in technology standardization. In contrast to these deductive approaches, where oppositional logics are derived from classical dialectical philosophy and subsequently empirically examined, Karjalainen et al. (2019) take an inductive approach, where oppositional logics of "prioritization, vacillation, compromise, and transcendence" (pp. 692-694) are identified from an interpretive case study using grounded theory methodology. Moe et al. (2017) use Hegelian dialectical inquiry to examine tensions in the requirements specification of public IS procurement. Using ethnographic methods, Yamauchi (2014) discusses how logics of negotiating and synthesizing create contradictions within and between material conditions and knowledge. Chae and Bloodgood (2006) conceptually develop a paradoxical framework for knowledge management based on the logic of ying-yang.

These examples underscore that dialectical inquiry can be combined with a wide range of research methods and approaches. Not only can dialectical inquiries be conceptual or empirical, but they can also be combined with qualitative or quantitative methods and with inductive, deductive, or abductive approaches.

Applications of the Principle of Historical Transformation (P6)

As the most advanced principle, only 6 of 63 (9.5%) publications apply P6, usually with reference to the classical dialectical philosophy of Hegel or Marx. Examples of Marxist dialectical inquiries include Saravanamuthu's (2002) analysis of how business process re-engineering transformed labor relations from a capitalist mode of production to worker emancipation; Lee's (2016) analysis of the historical development of the Korean Internet as a struggle between state control and free speech; and Greenhill and Wilson's (2006) analysis of how the history of capitalist reforms has shaped gender and family norms which, combined with the move to flexible telework enabled by ICT, resulted in the family home becoming 'haven and hell' for female home workers facing contradictory demands as earners and housewives. As a testimony to the continued relevance of historical transformations, the latter paper – published nearly two decades ago – could hardly be timelier today, where the COVID pandemic has disrupted many societal norms, illustrating well how history does rhyme sometimes.

This is also the topic of Wang et al.'s (2020) Hegelian dialectical inquiry into knowledge work. Similar to the above publications, these authors examine the sociotechnical phenomenon of digital nomadism in its historical context to reflect on the salient tension (corporate 9-to-5 worker versus digital nomad) created by a latent opposition (factory paradigm versus hypermobility paradigm) triggered by the COVID pandemic. Through a synthesis, the paper then envisions possible futures for knowledge work between the dystopian 'digital Taylorism' paradigm and the utopian 'worker autonomy' paradigm. In this way, P6 can be applied not only to look backwards in history, but also to enable forward-looking analyses of multiple plausible futures. Further, Wang et al. (2020) is one of only two publications that apply P6 using both primary and secondary empirical data – the other example being Reimers et al.'s (2014) dialectical analysis of long-term inter-organizational IS change in the Australian pharmaceutical industry.

Because P6 demands a long-term perspective on qualitative change, most publications apply it by drawing primarily or exclusively on secondary data, such as historical archives (Lee 2016), published case studies (Saravanamuthu 2002), policy reports and philosophical books (Greenhill & Wilson 2006), and history of science books (Riemer & Johnston 2019). This is a complex and intellectually demanding endeavor taking up the better part of a publication, which might explain why P6 is so rarely applied, and if applied, only in combination with few other principles, given spatial limitations of journal articles. Hence, readers should be mindful of the complexity involved in applying P6 and not necessarily interpret the lacking application of other principles as a weakness of such publications. In contrast to P4, where the focus is on iterative change through short- or mid-term cycles, the sampled IS publications apply P6 with a focus on transformational change historically accumulating over several decades.

Contribution

Dialectical inquiry has emerged as a valid and important IS research method. While our analysis evidenced that most premier IS journals welcome dialectical inquiries, and that there is a sizeable community of IS researchers using dialectical inquiry, there has been scarce methodological guidance on how to apply and evaluate dialectical inquiry. So far, IS researchers have applied dialectical inquiry selectively and sporadically by drawing implicitly or explicitly on dialectical philosophy or by seeking inspiration from extant IS publications. To the best of our knowledge, this paper is the first to suggest a set of principles that are grounded in dialectical philosophy, evidenced in IS publications, clearly distinct from each other, and together comprehensive. This contribution to dialectical inquiry methodology may help IS researchers in a number of ways:

1) Researchers can design their dialectical inquiries more systematically by drawing on a manageable set of principles synthesized from a diverse body of literature. Without the presented principles, each dialectical inquiry publication would have to derive the methodological foundations from diverse references and use significant manuscript space to synthesize and explain them.
2) Researchers can articulate and justify their dialectical inquiries with reference to principles that are firmly grounded in dialectical philosophy and evidenced in a significant body of IS literature, no longer needing to defend their work against criteria derived from other research methods.
3) Researchers using dialectical inquiry can consider each principle carefully and ensure all important and relevant principles are applied and articulated, safeguarding themselves against accidental negligence and preventable negative surprises in the peer review process. Conversely, reviewers

and editors can use the principles to evaluate dialectical inquiries and ask for clarification where authors did not apply some seemingly appropriate principles.

4) Our proposed principles may motivate the advancement of dialectical inquiry as a more widely used IS research method, challenging others to articulate their constructive criticism, and stimulating reflection and discourse on dialectical inquiry in the IS discipline.

5) Readers who do not conduct dialectical inquiries can better appreciate its nature, potentially increasing the acceptance and understanding of dialectical inquiry in the IS community, even among those who may commit to distinctly different methodological repertoires.

Readers should be mindful not to equate our evidenced application of the principles in IS publications with the ideal application of the principles. There might be other, and possibly better, ways to apply the principles of dialectical inquiry. In fact, a manuscript could illustrate all of our principles and still not meet the bar for publication. As always, this remains a judgement call. Researchers, reviewers, and editors should not abdicate the effort of working out when and how the principles should be applied in various contexts.

Conclusion

Our synthesis of principles suggests that dialectical inquiry has enriched IS research in many ways. We selected and analyzed 63 publications in 18 reputable journals that study oppositional IS phenomena using dialectical inquiry explicitly or implicitly. We found growing activity and considerable variety in the application of the principles. Although we took an inclusive approach to literature search and synthesis, casting a wide net of 51 journals in IS and related disciplines, most publications appear in premier IS journals, affirming that dialectical inquiry can lead to publication in premier outlets. The IS discipline is inherently interested in oppositional forces. Dialectical inquiry has at this point enriched research on phenomena of core interest to the IS community, such as IS use, development, change, adoption, and implementation; but we also see growing use of dialectical inquiry into emerging phenomena, such as crowdfunding, virtual teamwork, and digital infrastructure evolution. This suggests that dialectical inquiry is appropriate to study both traditional and emerging sociotechnical phenomena. From that vantage point, the IS discipline has so far underutilized dialectical inquiry. Although all sampled publications apply some principles, albeit with variation in their application, the more advanced principles of opposition-response cycles, oppositional logics, and historical transformations have been underutilized. Overall, this paper makes a methodological contribution by advancing dialectical inquiry as an IS research method.

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