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Grounding the Dissertation in Practice (DiP) in Dialectic Pluralism:

Improvement Science as a Metaparadigm for the EdD

Lester A. C. Archer
Western Kentucky University
lester.archer@wku.edu

ABSTRACT

The use of Improvement Science (IS) for the dissertation in practice (DiP) must be encouraged because the questions and concerns addressed in these projects go beyond answering basic research. Authors of dissertations in practice will bring philosophical assumptions, select research designs, and situate themselves somewhere along the practitioner continuum. DiP authors should be aware of the larger philosophical questions relating to the ontological, epistemological, methodological, axiological, and rhetorical grounding of Improvement Science. Grounded in these large philosophical questions, the Improvement Science project should be identified as a metaparadigm and counted among other research methodological paradigms.

KEYWORDS

methodological paradigm, dissertations in practice, Improvement Science, practitioner-scholar

Before starting their research project, the scholar-practitioner considers many elements. For instance, there is consideration for identifying a system problem, collecting, analyzing, and interpreting data. From the interpretation, there may be implementation of viable solutions to expedite change. Other considerations should include a purpose and research question(s). Important components include the methods. Notwithstanding, the key component that grounds the project relies on the choice of methodology. The methodology provides the *oikos*—the overarching structure in which the project is understood. The methodology frames "the research strategy that outlines the way one goes about undertaking a research project" (Howell, 2013, p. ix) which impacts the methods and consequent outcomes of the investigation. Methodological differences, nuances, and similarities must be teased apart, and teasing apart research approaches affords us an understanding of the methodological paradigm.

In the context of social sciences, research in the methodological space involves understanding human behavior. One approach is the use of quantification of human behavior. Other approaches include non-quantitative data such as interviews and observations (Creswell, 2009). Differences between quantitative and qualitative data have been delineated within paradigms (Creswell, 2009; Johnson 2011; Lincoln et al., 2011). Given the recent encouragement to reimagine the EdD, doctoral students engaging in the dissertation in practice (DiP) should understand how Improvement Science (IS) fits into the methodological space.

The Carnegie Project on the Education Doctorate (CPED), on their website, defines the DiP as a scholarly endeavor that impacts a complex problem of practice (CPED, 2022). In addition, CPED mentions a problem of practice (PoP) as a persistent, contextualized, and specific issue embedded in the work of a professional practitioner, the addressing of which has the potential to result in improved understanding, experience, and outcomes. The DiP is used to organize and present possible answers to a PoP. Perry et al. (2020) mentioned that the DiP graduate signifies they have engaged in a rigorous process, focused on framing their expertise, and obtained a doctorate (EdD) distinguished from the PhD. A host of methodological approaches for the DiP includes action research (Jackson, 2019), program evaluation (Varga et al., 2022), and IS (Barnes, 2021). Perry et al. (2020) advanced the discussion for the use of IS.

Hinnant-Crawford (2020) succinctly stated that IS can be distinguished from other educational research because it serves as a guide "through the process of improving" (p. 23). Recognizing the roots of IS in healthcare and business, Crow (2019) highlighted multiple frameworks within the IS project such as the system diagram, fishbone analysis, with the Plan, Do, Study, Act (PDSA) model as the cornerstone of the methodology (p. 9). The primary use of the PDSA cycle, as the cornerstone, is to test changes by moving ideas to action, and it can be used to answer the question: *How will we know that a change is an improvement?* (Langley et al., 2009).

Currently, authors differ in their descriptions of IS with respect to methodology. For instance, Hinnant-Crawford (2020) referred to IS as a methodological framework "undergirded by foundational principles" (p. 1), while Hannan et al. (2015) wrote that IS provides "a structure for learning about how work systems produce outcomes—this methodology allows users to learn rapidly about the function of their system by introducing and testing changes" (p. 496). Similar to Crow (2019), Hannan et al. (2015) noted IS as a methodology. Yet, Perry et al. (2020) described IS as "a methodological approach built on pragmatism and science that uses disciplined inquiry to solve problems of practice" and further elaborated, "Improvement Science focuses on high leverage problems and the systems that surround those problems" (p. 27). The use of approach evokes ambivalence. Would novice researchers such as authors of the DiP interpret IS as a specific methodology, or is it possible they may understand IS as a

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process? These three constructions—methodological framework, methodology, and methodological approach—portray and provide the essence of IS; however, the nomenclature needs clarity. These constructions recognize the logic, principles, structure, and word methodology. However, there is a point of departure: how best to name IS in the methodological space. Should IS be understood as either a methodological framework (Hinnant-Crawford, 2020), a methodology (Hannan et al., 2015), or a methodological approach (Perry et al., 2020)? Reimagining the EdD requires a reexamination of the nomenclature.

Since DiP authors using IS need care when selecting a methodology, the shared understanding of IS needs clarity. Care in choosing the methodology helps to frame the inquiry and narrow the DiP's scope, guides the DiP author in knowing where the change is occurring and how to evaluate any changes, and informs any data collection as well as analysis (Capello et al., 2024). Viewed as a framework, the early or novice researcher may miss the idea of multiple methodological approaches that can be used to structure the project. Indicating IS as methodology suggests distinguishing features setting it apart from others. From the perspective of an approach indicates ambivalence as a path or how to proceed. Using IS, DiP authors need to embrace how they view reality, how they incorporate theory, and how they come to know.

Purpose statement

The purpose of this essay is to describe IS as dialectic pluralism (DP). DP could be defined as a philosophy that pushes competing theories and practices not only toward confrontation but also resolution of differences (McCaffrey, 2024; Mitchell, 1982). As elaborated by Johnson and Schoonenboom (2016), DP is a process philosophy and theory that views reality as an ontological pluralism and "uses a dialectical/dialogical/hermeneutical epistemology and theory of inquiry" (p. 592). The dialectical epistemology uses a reflexivity, the dialogical epistemology includes a continual discussion, and the hermeneutical epistemology "involves a continual process of interpretation and building on past interpretations" (p. 592) that leads to synthesis.

The paper provides insight into reframing IS as DP which grounds mixed methodology as a methodological paradigm (Johnson, 2011). The discussion serves to advance the nomenclature of the CPED community. The paper fills a gap in the literature since little to no discussion has been found that substantiates IS as a distinctive research methodological paradigm. The article is organized as follows. The first section presents an overarching discussion of IS. The next section provides a brief discussion on IS as DP. Here, the discussion focuses on the answers to five fundamental philosophical questions that distinguish the underpinnings among paradigms. The last section includes suggestions for faculty advisors and EdD students.

IMPROVEMENT SCIENCE

Hinnant-Crawford (2020) noted that IS should be thought of as a methodological framework that is undergirded by foundational principles. IS affords the examination of a system, identifying problems, and applying solutions for change(s). IS guides scholar-practitioners not only to define problems and to understand how systems produce problems but also how to recognize the needed changes and to test the efficacy of those identified changes (Hinnant-Crawford, 2020). In other words, the scholar-practitioner poses three fundamental questions: 1) What is the exact problem that needs to be solved? 2) What changes might be introduced and why? 3) What knowledge will be needed to recognize improvement occurred? (Hinnant-Crawford, 2020; Spaulding & Hinnant-Crawford, 2019). These questions suggest that careful approaches to the DiP are needed. Identifying the exact problem means avoiding nebulous and poorly defined problems (Hinnant-Crawford, 2020). Introducing possible changes means "to recognize the system that is producing the results" (Hinnant-Crawford, 2020, p. 101). And recognizing improvement suggests that after deploying the theory of improvement DiP authors need to examine system indicators. They need to examine driver measures (Is the theory of improvement working?); process measures (How is the theory of improvement working?); outcome measures (Did the theory of improvement work?); and balancing measures (Is the theory of improvement working as intended?) (Hinnant-Crawford, 2020).

The designs of the DiP need to go beyond traditional single focus methodologies, especially with more complex problems. Some single focus methodologies that come to mind—case study, mixed methods, action research, and phenomenology. As the CPED community continues to engage in thinking about the DiP and its nomenclature, the effort and energy expended will necessitate a closer examination of IS as beyond a methodological framework that attends to single focus methodologies.

According to Wasserman and Kram (2009), each of quantitative, qualitative, mixed methods, action research, and evaluation methodologies are within the scholar-practitioner continuum. While these methodologies provide for natural overlaps (Mertens, 2015), they do not guide the scholar-practitioner "through the process of improving" (Hinnant-Crawford, 2020, p. 23). While I agree that single focus methodologies are acceptable and useful for a DiP, my argument leans on advancing IS as philosophically and theoretically grounded in DP (Johnson, 2011). The process of improving suggests that IS has its philosophical underpinnings that can be distinguished among research methodologies.

IMPROVEMENT SCIENCE AS DIALECTIC PLURALISM

Mitchell (1982) constructed DP as a pluralism that "pushes divergent theories and practices toward confrontation and dialogue" (p. 613). This push should get us to something new. Inayat and McCaffrey (2024) noted that DP can resolve conflicts arising out of differences among worldviews and may even help developing [nursing] knowledge by incorporating multiple worldviews. They highlighted multiple worldviews can result in ontological and epistemological conflicts when scholars rigidly remain devoted to their favorite worldviews. For scholars and practitioners, points of conflict may include clinical settings, sociocultural differences, and methodological approaches (McCaffrey, 2024). In the healthcare milieu, McCaffrey (2024) noted that clinical settings have values and beliefs that may not align with patients, sociocultural backgrounds may not be common among colleagues, and training in quantitative methodologies may conflict with using qualitative insights. For DiP authors, similar tensions may exist. They may be pursuing projects in settings where colleagues defend quantitative data, but they do not value qualitative data. These moments call for dialogue.

DP provides a space to develop nuanced and comprehensive knowledge. Johnson (2011) positions DP as a philosophy designed to produce the "mixed methods perspective" (p. 31). Johnson (2011) referred to metaparadigm as DP. For Johnson (2011), the key idea is to "understand and purposively, dialectically, and dialogically engage with difference and interact with multiple paradigms, disciplines, positive values, and concepts" (p. 31). IS can be viewed as a metaparadigm. The IS project gets us to something new.

Engaging IS, DiP authors need to make connections to multiple perspectives as it relates to seeing the system for what it is. They need to understand the system (Hinnant-Crawford, 2020). This understanding can be identified during the iterative plan, do, study, and act (PDSA) cycle. According to Langley et al. (2009), this cycle turns ideas into action, which connects action to learning. The system interacts with people who identify with different paradigmatic beliefs. Johnson noted that DP "can dialogue with multiple ontologies, multiple epistemologies, multiple ethical theories and values, and multiple methods and methodologies" (p. 31). Since the DiP project could bring together many epistemological and methodological backgrounds (e.g., transformative and postpositivist paradigms) to address broad issues (e.g., social justice) for building additional research, IS fits as a metaparadigm grounded in DP in which the key idea "is to understand and purposively, dialectically, and dialogically engage with difference and interact with multiple paradigms, disciplines, positive values, and concepts" (Johnson, 2011, p. 31). Here, we need to recognize that an IS project may be intentional or grounded in social justice with a methodological paradigmatic stance situated in the critical or transformative (Creswell 2009; Mertens & Wilson, 2018) while including a postpositive methodology.

Fundamental philosophical questions posed by theorists provide guidance as it relates to the underpinnings among research paradigms (Johnson, 2011). For instance, the argument by Lincoln et al. (2011) provides for "three fundamental questions" (p. 108) that can be summarized in response to questions relating to the ontological, the epistemological, and the methodological. These guiding questions are: 1) What is the ontological? 2) What is the epistemological? 3) What is the methodological? In discussing paradigms as worldviews, Creswell (2009) added two: 4) What is the axiological? and 5) What is the rhetorical? The answers to these five questions assist in the shared understanding of a research paradigm.

Ontology

Derived from the Greek word, *ὄντος* (ontos), ontology is the study of the nature of reality. What is the nature of reality? How do we construct our reality? Is truth within us or external to us?

Quantitative researchers view reality as objective. In this research paradigm, truth is external. Ergo, there exists an external reality. Positivism may be defined as a paradigm "guided by the claim that only sense-confirmed knowledge is affirmed knowledge" (Maksimović & Evtimov, 2023, p. 209). For positivists, there is a unity in science grounded in discovery and guided by laws using measurement to test theory (Maksimović & Evtimov, 2023). However, not all quantitative methodologists should be identified as positivists. Postpositivist understandings exist. Critical analysis of positivism led to postpositivism. Postpositivism extends the argument of positivism to include the understanding of truth as probable—reality is not absolutely objective because of too many interacting causal factors, reality is constructed, and there is possible researcher influence (Maksimović & Evtimov, 2023; Onwuegbuzie, 2002). Ontologically, a point of departure for postpositivist, among others, is critical realism which recognizes reality as imperfect (Lincoln et al., 2011).

Qualitative researchers recognize subjective reality. Truth is within the individual. Mixed methods researchers rely on singular and multiple realities. These researchers appreciate the objective and the subjective (Creamer, 2017). Creamer (2017) positions mixed methods as fully integrated in which the dialectic engages qualitative and quantitative strands. The intersubjective nature of reality, called the dialectic, fits mixed methods (Creamer, 2017).

Program evaluators and action researchers share more in common; however, the purpose of the evaluator is to make a judgment about the program, policy, or product, for instance. For evaluations, each evaluator will bring a worldview, and each project will be grounded in a paradigm that depends on the goal. Evaluators draw on quantitative, qualitative, or mixed methods ontological interpretations. Evaluators rely on objectivity, subjectivity, pragmatism, or transformative approaches (Mertens, 2015; Mertens & Wilson, 2018). Mertens and Wilson (2018) used the metaphor of four branches on a tree to map postpositivist evaluations onto the Methods Branch, constructivist evaluations onto the Values Branch, transformational evaluations onto the Social Justice Branch, and pragmatist approaches onto the Use Branch. For Mertens and Wilson (2018), Methods Branch evaluators understand "reality can be known within a certain level of probability" (p. 56); Values Branch evaluators understand truth as subjective; Social Justice evaluators view reality "in terms of power relations….shaped in social, cultural, and historical contexts" (p. 164); and Use Branch evaluators value evaluations based "on the demonstration that the results 'work' with respect to the problem that is being studied" (Mertens & Wilson, 2018, p. 86). Because of the nature of the kinds of research questions pursued within a specific milieu, action researchers' ontological position can be distinguished from solely quantitative or qualitative methods.

IS researchers and practitioners would rely on pragmatism. Perry et al. (2020) have recognized the role of pragmatism as the ontological positioning. Hinnant-Crawford (2020) concurs. Humans make meaning of a system's existence. Among the tools of IS include empathy interviews, questionnaires, fishbone diagrams, systems diagrams and charts, and value stream mapping (VSM). The data collected using these tools include quantitative and qualitative data that combine to provide a holistic understanding of the system needing change.

Epistemology

The study of knowledge and its justification, *ἐπιστήμη* (episteme) concerns, among other things, the conditions, sources, and structure of knowledge as well as justified beliefs. More broadly, epistemology is the study of the creation and dissemination of knowledge (https://plato.stanford.edu/entries/epistemology/#SOU).

Epistemology can be distinguished among quantitative, qualitative, and mixed methods researchers. Quantitative researchers believe that scientific knowledge is progressive and that we can predict phenomena from theories. For these researchers, a true state of the world exists. Hypothesis testing, either by confirmation, as noted by Thomas Kuhn, or refutation (finding evidence contradicting predicted results), as proposed by Karl Popper, affords us the amount of support for a theory, as we search for Truth (Omar, 2012). From the quantitative worldview, universal standards exist which are "out there." However, for postpositivist,

objective findings are juxtaposed with subjective realities. Qualitative researchers acknowledge that knowledge is relative to the knowers. There is no universal truth out there waiting to be discovered. Hypothesis testing is not the concern. The knower is the one who knows. Each knower is subjective and their own agent. As a result, reality exists in varying standards, which suggests that the justification of our knowledge is an individual and a group enterprise. Knowledge builds, and there is shared understanding. For mixed methods researchers, pragmatism affords allowing what works for whom in each context (Johnson & Onwuegbuzie, 2004). Mixed methods researchers find subjectivity and objectivity commensurable. In other words, mixed methods research theorists recognize that qualitative data can complement, supplement, or offset the quantitative. Morgan (2019) noted that convergence occurs when the two sets of data are pursued separately until integration; divergence uses differences between the data sets "to produce a richer interpretation" (p. 9) of original contradictions; and, complementary recognizes that each method "offers something that would be difficult for the other to produce" (Morgan, 2019, p. 8). However, because of multiple outcomes engendered in mixed methods projects, authors need to be accountable in their claims (Morgan, 2019).

As noted earlier, program evaluation projects will have objectives and designs selected by the evaluator. Each project will be designed within a worldview (Mertens & Wilson, 2018). Evaluators can then rely on their epistemological stances from among quantitative, qualitative, mixed methods, or transformative-emancipatory approaches (Mertens & Wilson, 2018). For action researchers, knowledge is not exclusive to scientists—expert and local knowledge are combined (Brydon-Miller et al., 2003). Action research has more of a liberation and democratic underlying theory of epistemology. Masters (1995) noted four major themes defining action research: 1) empowerment of participants, 2) collaboration through participants, 3) acquisition of knowledge, and 4) social change. Using action research, the participants plan, observe, and most importantly self-reflect.

IS relies on shared knowledge of system tools and system dynamics. The relationship between the knower, when considering IS and reality, would be filtered through three major questions: 1) What is the exact problem that is going to be solved? 2) What changes might be introduced and why? 3) What knowledge will be needed to recognize improvement occurred? (Spaulding & Hinnant-Crawford, 2019). IS requires a combination of subject matter knowledge and profound knowledge to gain a better "understanding of the properties of a system" (Langley, et at., 2009, p. 76 - 77). Shared understating of the system among the people interacting within the system creates the reality. There needs to be credible inferences and justifications for optimal operation of the system. The shared and taken for granted is identified in how well the system continues to function, and the knowledge of the system is grounded in the pragmatic. The use of IS tools (e.g., five whys technique and empathy interviews) and run charts highlight the pragmatic.

Methodology

Methodology is best described as generating and justifying knowledge. Howell (2013) noted that methodology may be thought of as the overarching philosophy underpinning the use of specific methods. Tan (2018) describes methodology as "the link between theory and evidence" (p. 4). Methodology should be tended to by both researcher and practitioner. Methodology is recognized in the scenario in which a researcher with an interest in testing a theory may control for a specific variable, and they may use basic research, given a phenomenon of interest. For example, the researcher may set up different stressful scenarios to explore stress and its effects on behavior. Methodology could also be recognized when a practitioner, with the same interest and focus on the applied, may not be able to control a particular variable. The practitioner may focus on different variables and analysis. A practitioner may be interested in whether a new procedure added stress and impacted job satisfaction. In this scenario, they may not be able to control, say, the number of hours worked by a participant. Investigators apply methodology when they link theory to evidence, despite the particularized methods.

Researchers use particularized methods according to the research questions and the design. Quantitative researchers principally collect categorical and numerical data. For quantitative approaches, causal explanations, predictions, and descriptions necessitate the use of experiments, quasi-experiments, and questionnaires, among others. Quantitative researchers focus on the deductive. Qualitative methodology includes the examination and exploration of data for themes and gaining a better understanding of perspectives from individuals. Qualitative data methods include interviews, images, and observations. Qualitative researchers focus on the inductive. Mixed methods researchers collect multiple kinds of data. These researchers integrate quantitative and qualitative approaches to gain a better understanding of "context, perspectives, or conditions" (Johnson, 2011, p. 34). Mixed methods researchers include the inductive and deductive.

Given the focus and aims of an evaluation, evaluators can use methods from among quantitative, qualitative, and mixed approaches. Methods available for evaluators and action research include those from quantitative and qualitative research. Action researchers engage in an iterative process. This process is unlike that of researchers and evaluators because the former can conclude a study and the latter concludes with a judgement of the evaluand. Like evaluators, action researchers may draw on multiple methods.

Methods for data collection for IS include tools to map out goals and actions such as driver diagrams, the Five Whys Technique, system maps, process maps, and fishbone diagraming. A driver diagram can help to answer the question, "What change can we make that will result in improvement?" (Langley et al., 2009). Driver diagrams describe the theory(ies) of improvement and can be used as a tool to help organize ideas for improvement (Hinnant-Crawford, 2020; Langley et al., 2009). The Five Whys Technique, developed by Sakichi Toyoda, examines a problem by iteratively asking why five times—after the initial response to the first why, the interviewer then asks why. This technique helps in understanding a problem or situation (Hinnant-Crawford, 2020; Perry et al., 2020). System and processing maps are two types of tools to help to identify boundaries, components, and activity in system. They help to recognize the system that is producing the results (Hinnant-Crawford, 2020). Fishbone diagraming, also called Cause-and-effect diagrams, helps to identify, collect, and organize "current knowledge about potential causes of problems or variation" (Langley et al., 2009, p. 412). Fishbone diagrams allow for exploring and uncovering causes contributing to the problem (Perry et al., 2020). Taken together, these methods help to identify possible causes and effects within a system. In addition, value stream mapping is a unique tool for use in system improvement (Langley et al., 2009). For IS, multiple data collection methods are necessary.

Axiology

From the Greek word, ἀξία (axia), axiology is the study of values. Axiology is a branch of philosophy that addresses what we have come to understand as ethics. A simplistic interpretation of ethics would describe our actions and explain how they may influence or affect others. Paradigmatic stances create grounds for differing perspectives on values. Quantitative researchers deploy objective standards of validity and reliability (Creswell, 2009). Researchers in this space take steps to minimize their biases and make attempts to ensure that these biases are minimized in order not to affect data collection, interpretation, or conclusions, among others. Qualitative researchers acknowledge researcher bias as they study phenomena from the perspectives of participants. These researchers recognize that data collection and interpretation could be laden with "personal, cultural, and historical experiences" (Creswell, p. 8). Qualitative researchers embrace subjectivity. In the mixed methods research space, there is combining of quantitative and qualitative worldviews which afford researchers the flexibility to choose methods and procedures that fit the goal of the specific project. Mixed methods researchers value the subjective as well as the objective and the interplay of these perspectives (Creamer 2018, Johnson & Onwuegbuzie, 2004). For mixed methods researchers, what works as truth is what works at the time.

The diversity of perspectives among evaluators and their axiological interpretations would be reflected within the respective evaluator's belief. These beliefs have been termed Branches (Mertens, 2015; Mertens & Wilson, 2018). For Mertens and Wilson (2018), four branches exist, and each branch maps to a methodological paradigm. The Methods Branch maps onto the postpositive paradigm; the Values Branch maps onto the constructivist paradigm; the Use Branch maps onto the pragmatic paradigm; and the Social Justice Branch maps onto the transformative paradigm. These branches can be aligned with quantitative research (Methods Branch), qualitative research (Values Branch), and mixed methods research (Use Branch). Additionally, Mertens and Wilson (2018) included the Social Justice Branch, which highlights the concerns, perspectives, and voices of marginalized groups. For Mertens and Wilson (2018), the inclusion of social justice in the evaluation paradigm reflects axiological assumptions highlighting awareness of discrimination and the need for understanding the mechanisms that perpetuate oppression, and these assumptions are grounded in the explicit mandate to change and to influence the status quo. Action researchers would incorporate value judgments since among the goals of action research include democratic participation. Action research and the participants in the project have a voice as they engage in the project to improve their lives (Díaz-Arévalo, 2022).

The values and ethical concerns of IS is not as overt in its democratic aims. IS projects can be beneficial to participants; however, the aims and intentions are not necessarily about social justice since not every system meets those ends. In a generalized view, system change can be developed by examining the current system or inventing a new system (Perla et al., 2009). However, it is well-known within the CPED community that social justice is of importance, which is addressed in the first guiding principle of the CPED framework. This principle addresses the notion of framing questions grounded in equity, ethics, and social justice. The CPED guiding principles provide support for positioning ethics for DiP authors. With the focus on social justice, most EdD DiPs that use IS should be an investigation about a system and how best to diagnose existing problems, analyze practical solutions, and create meaningful change. Because the issues of democracy will naturally emerge, participants in the IS project may not be directly concerned with political agendas, per se. Participants in the IS project appreciate that systems affect behavior, and they value cooperation. As a methodological paradigm, IS focuses on the system. The actions and values of the researcher, as well as other stakeholders affected by the system, are answered by three principal questions. These questions provide directions for the DiP. The first question, "What are we trying to accomplish?" The answer connects with ethical ideas and rides on the notions of justice and equity. The second question, "How will we know that a change is an improvement?" relates to fidelity and the extent to which the right actions were conducted, at the right time, with the right intent. The third question, "What changes can we make that will result in improvement?" suggests a connection to beneficence. Here I use beneficence to mean changes should tend to nonmaleficence.

Rhetoric

Rhetoric, from the Greek word ῥητορικός (*rhētorikós*) relates to the oratorical. Drawing on Herrick (2017), I use rhetoric to mean a structure that helps to organize our thinking and use of voice (Lincoln et al., 2011). Using this broad notion, I note that structure and the accompanying nomenclature differs for each paradigm (see Table 1). Engaging the quantitative methodological paradigm, authors use rhetoric to structure a deductive argument. Authors begin with theories and test these by way of hypotheses. Specific nomenclature includes words and phrases such as randomized control trial, inferential statistics, replicability, and validation. For qualitative approaches, authors rely on inductive thinking. Authors may start with specific observations or other qualitative data, and they use analytical techniques such as coding and thematic analysis to build theory. Nomenclature includes words and phrases such as axial coding, saturation, and trustworthiness. In the qualitative methodological paradigm, researchers acknowledge their biases. In fact, authors sometimes are encouraged to report how they specifically situate themselves in the study. Lincoln et al. (2011) identified voice that belongs to the researcher and participants. Voice can be the researcher(s) or the participant(s) or shared between the researcher and participants. Voice enables objectivity when used in the (post)positivist paradigm. For the interpretive (qualitative), voice is shared and representative of the participants and researcher. IS would use voice in similar ways as the interpretive—voice is shared and representative of the participants and researcher.

Mixed methods research, program evaluation, and action research will approach rhetoric differently. In mixed methods research, the rhetorical structure will require a bilingual understanding to convey and to integrate statistical and qualitative data. Mixed methodologists incorporate pragmatic approaches to data. Theory requires abductive reasoning, moving back and forth between inductive and deductive reasoning (Morgan, 2007). In mixed methods, the expected nomenclature would include those from the quantitative and qualitative. However, novel approaches to validation are called legitimation (Onwuegbuzie & Johnson, 2006). The use of legitimation moves away from the use of controversial terms such as validity and credibility, allows for multiple points to provide validation, and supports paradigmatic mixing (Creamer, 2018).

Evaluations would be designed with concerns that include identifying inputs, processes, and outcomes of evaluations (Mertens & Wilson, 2018; Patton, 1975). Evaluators will use the respective rhetoric drawn from quantitative research (Methods Branch), qualitative research (Values Branch), Social Justice (Transformative Branch), and mixed methods research (Use Branch). Action researchers will recognize the "more pluralistic scientific enterprise" (Chesler, 1991, p. 766). For action researchers, the rhetorical approaches will be sensitive to the larger democratic goals of the project outcomes. These projects recognize the voices and relationships with participants.

There are a variety of tools and rhetorical devices available for the IS project. Given the assumption that pluralism fits IS, the rhetoric here will focus on context-based problems and solutions. The language is inclusive and has multiple perspectives. Similarly, as in mixed methods approaches, there is an understanding as it relates to the language of quantitative and qualitative data. IS draws from many methodologies and transformative perspectives. For instance, the use of the Five Whys and system mapping helps in the organizing of the DiP. In addition, the use of the PDSA and how situated with the DiP project should help the reader. Voice becomes important for the IS project because the tools used in the IS project capture the perspectives of participants.

SUGGESTIONS FOR DIP COMMITTEES

Committees and DiP authors need to have conversations about the methodology. The importance of methodology cannot be underestimated because it brings together the philosophy, design, and methods of the DiP. When relying on IS, the committee and DiP author(s) should discuss and bring clarity to the ontological, epistemological, methodological, axiological, and rhetorical positionality, which lay the groundwork and create conditions for the underpinnings of the project. The underpinnings provide the support for assurances that the problem is identified, proposed changes are implemented, and evidence exists to show whether change occurred. In other words, the purpose, research questions, and methods will be situated. Table 1 positions IS among well-known methodologies that may be of interest to DiP authors. Committees need to ensure that the iterative process of IS can be identified through the PDSA cycles. The practitioner-scholar needs to carefully select and to use many of the tools available for data collection methods. Authors who rely on IS for their EdD DiPs need to orient their readers to IS and should be encouraged to provide a brief treatment as it relates to positioning IS as a metaparadigm. Once this is provided, then discussion relating to the use of other methodologies within the IS project becomes clearer.

The IS ontological, epistemological, methodological, axiological, and rhetorical understanding must be conveyed, discussed, and

Table 1. Positioning Improvement Science

	IS	Quantitative[a,c] (Post positivism)	Qualitative[b]	Mixed Methods	Evaluation	AR (PAR)[d]
Ontological	-pluralism -holistic view of the system change	-objective reality -truth/reality is external -(critical realism)	-subjective reality -Truth is within the individual	-objective and subjective -reality is dialectic	-depends on the goal -objectivity, subjectivity, pragmatism	-pragmatism -reflexivity -(emancipatory transformation)
Epistemological	-subject matter and profound knowledge -credible inferences	-predict from theory -true state of world exists -Hypothesis testing -(modified objectivism)	-knowledge is relative to knowers -no universal truth	-subjectivity and objectivity in proportion -qual data complement, supplement, or offset quan data	-quantitative, qualitative, mixed methods, and transformative/ emancipatory	-knowledge not exclusive to scientists or experts -(subject-subject)
Methodological	-Multiple possibilities	-categorical and quantitative -causal explanations, predictions -(diversify sources)	-exploration of data for themes -dialectic	-integrate quantitative and qualitative	-quantitative, qualitative, and mixed approaches	-iterative process -multiple methods
Axiology	-appreciate systems affect behavior -cooperation -privileges the system	-objective standards of validity -minimize biases	-acknowledge bias -data collection laden with experiences	-subjective and objective -truth is what works at the time	-reflected within the Project -Social Justice highlights marginalized groups	-democratic participation -(people in foreground)
Rhetoric	-draw from the language of any paradigm -nomenclature on context-based problems and solutions	-deductive argument -nomenclature includes randomize control trial, inferential statistics, replicability, and validation	-inductive argument -nomenclature includes axial coding, saturation, and trustworthiness -acknowledge biases	-integrate statistical and qualitative data -draw on quantitative and qualitative; novel approach to validation	-draw from quantitative, qualitative, mixed methods	-democratic goals of the project outcomes -recognize voices and relationships

Note. Adapted from Creswell, J. W. (2009). Research design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage. [a,b]See Lincoln, Y. S., Lynham, S. A., & Guba, E. G. (2011). Paradigmatic Controversies, Contradictions, and Emerging Confluences, revisited. In N. K. Denzin & Y. S. Lincoln (Eds.), The SAGE Handbook of Qualitative Research (4th ed., pp. 97–128). Sage. [c]See Sławecki, B. (2018). Paradigms in Qualitative Research. In M. Ciesielska & D. Jemielniak, D. (Eds.). (2018). Qualitative Methodologies in Organization Studies. Palgrave Macmillan. [d]See Díaz-Arévalo, J. M. (2022). In search of the ontology of participation in participatory action research: Orlando Fals-Borda's participatory turn, 1977–1980. Action Research, 20(4), 343-362. AR = Action research. PAR = Participatory Action Research

understood. These philosophical questions and answers can be pursued throughout the dissertation process. Formal in-class and informal discussions are appropriate venues. The DiP author should assume that their committee members may or may not share common constructions of reality, given differing paradigmatic stances. Given the positioning of differing ontological stances, clear communication becomes necessary. The DiP author should discuss with committee members how each views the world. Naturally, reading prior academic work by committee members, or if possible, taking at least one course with each committee member would assist. Epistemologically, the committee shares in the endeavor. The relationship between the knower and the known is situated by gaining knowledge of the system. The committee should assist the DiP author to recognize the importance of the creation and dissemination of knowledge. The DiP that relies on IS and how the project is articulated becomes part of knowing there is an improvement. The DiP author and the committee should work together to identify the exact problem to be solved as well as how to recognize changes. Hinnant-Crawford (2020) provides four questions which help to tease apart knowledge about change of the system: 1) Did it work? 2) Is it working? 3) How is it working? and 4) Is it working as intended? In concurrence with Hinnant-Crawford (2020), Perry et al. (2020) noted that knowledge about change is grounded in Outcome, Process, Driver, and Balance drivers. These metrics assist to answer the question: How will we know if the change was an improvement? Pursuing the PoP should get us somewhere.

Methodologies are the underpinnings of scientific investigations. Although there is an understanding that IS shifts research from the laboratory, the project is based on rigorous scientific investigation (Hinnant-Crawford, 2020; Langley et al., 2009; Perry et al., 2020). The committee and the DiP author should ensure that they take time and work together to identify and understand the complexity of the PoP (Perry et al., 2020). These actions should lead to identifying the change ideas and how best to know it occurred. Multiple methodologies are possible. DiP authors have the flexibility to identify appropriate methodology which underpins their project. Multiple possibilities exist.

Axiology must be explicit because issues of justice and equity, executing the right actions, and ensuring beneficence are among the items that committees must manage. Although axiology may be implicit, IS projects are concerned with improving not only the system but also creating change. The committee needs to assist in identifying and connecting the project with the notions of social justice and equity, which aligns with the CPED framework. DiP authors, particularly for the use of IS, are encouraged to appreciate that systems affect behavior. Behavior also relates to fidelity to the project and the extent of the right actions conducted, at the right time, with the right intent and connected to beneficence.

With respect to rhetorical positioning, the DiP draws from any methodology. Rhetoric, in this context, relates to structure that helps in organizing thinking. Using this broad notion, DiP authors have the flexibility to use nomenclature drawn from differing paradigms. The nomenclature will center on context-based problems and solutions. In fact, nomenclature would be used appropriately. For instance, the dissertation committee would check and read how terms such as validation, trustworthiness, and legitimation are used in context and appropriately applied. Rhetorical use also includes use of voice. In their treatment of differentiating paradigms, Lincoln et al. (2011) identified voice. They recognize (post)positivist voices belong to the researcher and not the participants, which enables objectivity. For the interpretive (qualitative), voice is representative of the participants and researcher. Voice is mixed. The importance of mixed voices becomes important for the IS project. The tools used in the IS project capture the voices of the participants and the researcher.

CONCLUSION

The purpose of this essay was to describe why IS should be identified as a metaparadigm. Authors of DiPs will bring to their projects basic philosophical assumptions and will ground themselves somewhere along the practitioner continuum (Wasserman & Kram, 2009). However, given the CPED focus and its encouragement on developing scholar-practitioners, IS as an approach, framework, or a paradigm needs clarity. The discussion centered on five grounding questions that should be posed to help identify research methodological paradigms. Methodological research paradigms can be examined from the ontological, epistemological, methodological, axiological, and rhetorical. The answers to these questions assist in the shared understanding of a research paradigm. IS can be counted among quantitative, qualitative, mixed methods, evaluation, and action research. In the CPED community, not only is there a need for "consensus about which questions are worth asking and which methods are most appropriate for answering them… [but also there is need to] …share a consensus about the bases for warranted assertions about the workability of different lines of action" (Morgan, 2007, p. 66).

Now, I revisit the points of departure (see Figure. 1). I reimagine IS. Now, Hinnant-Crawford (2020) can mention IS as a metaparadigm "that is undergirded by foundational principles that guide scholar-practitioners to define problems, understand how the system produces the problems, identify changes to rectify the problems, test the efficacy of those changes, and spread the changes (if the change is indeed and improvement)" (p. 1). Hannan et al. (2015) can hold their position that IS provides "a structure for learning about how work systems produce outcomes—this

Figure 1. Reimaging the use of metaparadigm

Hinnant-Crawford (2020)	*Improvement Science* is a	metaparadigm	that is undergirded by foundational principles that guide *scholar-practitioners* to define problems, understand how the system produces the problems, identify changes to rectify the problems, test the efficacy of those changes, and spread the changes (if the change is indeed and improvement).
Hannan et al. (2015)	Improvement Science methods provide a structure for learning about how work systems produce outcomes—this		allows users to learn rapidly about the function of their system by introducing and testing changes in their existing practice.
Perry et al. (2020)	Improvement Science is a		built on pragmatism and science that uses disciplined inquiry to solve PoPs. Improvement Science focuses on high leverage problems and the systems that surround those problems.

[metaparadigm] allows users to learn rapidly about the function of their system by introducing and testing changes" (p. 496). Perry et al. (2020) are positioned to acknowledge IS as a metaparadigm "built on pragmatism and science that uses disciplined inquiry to solve problems of practice. IS focuses on high leverage problems and the systems that surround those problems" (p. 27). The use of IS for the DiP works as DP. IS should be noted as a metaparadigm. Nomenclature matters.

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