It is a Working Hypothesis:
Searching for Truth in a Post-Truth World

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Abstract

Public administration research methodology should be flexible and comprehensive enough to include many methodologies and approaches to inquiry. In this paper we show how certain kinds of qualitative and mixed method studies often lack of a clear theoretical structure and as a result are poorly aligned across the stages of the research process. This paper introduces *Working Hypotheses* as a useful micro-conceptual framework with the capacity to address the alignment issue. It is particularly applicable to deductive case studies, which use qualitative or mixed methods. We show how positivism, postmodern and pragmatist philosophies shape quantitative, qualitative and mixed methods research. We also examine how types of reasoning (inductive, deductive and abductive) underlie approaches to research. The working hypothesis conceptual framework is introduced, placed in a philosophical context, defined, and applied to public administration and policy.

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[T]he scientific attitude for Dewey was not found in its tendencies toward reductionistic thinking. Rather it was to be found in the cooperative spirit of exploration, creative speculation connected with practical action ... Science becomes most truly intelligent when it exhibits its creative and artistic side. The 'experimental spirit'… is the spirit of tentative exploration" (Alexander, 1987, 276).

"The scientist has no other method than doing his damnedest" (Kaplan, 1964, p. 27).

"It is human nature to hypothesize and give meaning to the world" (Becker, 1993, p. 256).

Introduction

Research methodology in public administration is a source of conflict and confusion. One reason is that the philosophical assumptions underlying quantitative and qualitative methods appear to be incompatible. Also, the diversity of public administration and policy calls for many different approaches to its multitude of problematic situations. Often, public administration research can be conceptualized using a problem and framework. Other times, deep dives into data enable the dimensions of a public administration experience to be examined. Each approach comes with different philosophical assumptions and set of useful skills.

In this paper we narrow the focus and introduce the versatile Working Hypothesis. Working hypotheses are provisional statements of expectations that allow for both qualitative and quantitative evidence (Shields and Rangarajan, 2013) and are useful tools/framework for empirical investigation in public administration and policy sciences. Since these fields are evocative of law in action (Milakovich and Gordon, 2013) They are ideal for the use of working hypotheses, which are predictive statements tested in action.

In order to make the argument that under certain circumstances working hypothesese are useful tools in these fields, we first, examine three philosophies that underlie approaches to public administration research methods (positivism, interpretivism and pragmatism). Second, these philosophies are used to define and highlight characteristics of quantitative, qualitative and mixed methods research. Public administration is intimately tied to the law. Third, we show the close parallels between some forms of legal reasoning and evidence collection/analysis and contemporary research methodology. Fourth, we examine the nature of theory and show how a kind of small scale theory can help align research design for deductive studies. We do this by fifth, zeroing in on a particular context - evidence based, deductive research and develop a set of frameworks that correspond to different research purposes. The working hypothesis, along with sister framework pillar questions are found among this set of frameworks. Sixth, we examine the nature and usefulness of the working hypotheses and pillar questions for qualitative and mixed methods studies, beginning with its historical use and ending with its application in contemporary public administration and public policy.

Philosophical Roots of Methodology

This section situates the Working Hypothesis within the philosophical roots of research methodology. According to Abraham Kaplan (1964, 23) "the aim of methodology is to help us understand, in the broadest sense not the products of scientific inquiry but the process itself." Methods contain philosophical principles that distinguish it from other "human enterprises and interests" (Kaplan, 1964, 23). Contemporary research methodology is generally classified as quantitative, qualitative and mixed methods. Each has a distinct philosophical perspective –

positivism, interpretive and pragmatism, respectively[1] sometimes referred to as paradigms

(Levers, 2013).

Positivism and its more contemporary version, post-positivism, maintains an objectivist

ontology or assumes an objective reality, which can be uncovered (Levers, 2013; Twining et al.

2017). Time and context free generalizations are possible and "real causes of social scientific

outcomes can be determined reliably and validly (Johnson and Onwuegbunzie 2004, p. 14).

Further, "explanation of the social world is possible through a logical reduction of social

phenomena to physical terms." It uses an empiricist epistemology which "implies testability

against observation, experimentation, or comparison" (Whetsell and Shields, 2015, 420 and 421).

Correspondence theory, a tenet of positivism, asserts that "to each concept there corresponds a

set of operations involved in its scientific use" (Kaplan, 1964, 40). This evidence-based

philosophy assumes the separation of facts and values.

The interpretivist or post-modernist approach is a reaction to positivism. It uses a

relativist ontology and a subjectivist epistemology (Levers, 2013).[2] In this world of multiple

realities, context free generalities are impossible as is the separation of facts and values.

Causality, explanation, prediction, experimentation depend on assumptions about the

correspondence between concepts and reality, which in the absence of an objective reality is

impossible. Empirical research can yield "contextualized emergent understanding rather than the

creation of testable theoretical structures" (O'Connor et al, 2008, p. 30). The incompatibility

between positivism and interpretivist philosophy is at the core of many controversies in

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[1] The following discussion oversimplifies each of these philosophical perspectives. The goal of this section is to show how these philosophies inform contemporary methodology and its literature.
[2] This perspective is also associated with phenomenology, hermeneutics, constructivism, and naturalistic inquiry (Twinning et al., 2017, Guba and Lincoln, 1981).

methodology, social science and public administration (Raadschelders, 2011; Whetsell and Shields, 2015; Fox and Miller, 1994).

With its focus on dissolving dualisms, pragmatism steps outside the objective/subjective debate. Instead, it focuses on asking, "What difference would it make to us if the statement were true" (Kaplan, 1964, 42). Its epistemology is connected to *purposeful* inquiry. Pragmatism has a "transformative, experimental notion of inquiry" anchored in pluralism and a focus on constructing conceptual and practical tools to resolve "problematic situations" (Shields and Whetsell, 2017). The working hypothesis is most comfortably situated within the pragmatic philosophical perspective (Shields and Whetsell, 2017).

Deductive, Inductive and Abductive Reasoning

Methodological approaches are also classified by the type of reasoning used. Theory is tested using deductive reasoning, which goes from the general to the specific (Hyde, 2000, p. 83). Hypotheses direct data collection and are tested using deductive reasoning. Inductive reasoning, on the other hand, draws "inferences from specific observable phenomena to general rules or knowledge expansion" (Worster, 2013, p. 448). Theory and hypotheses are generated using inductive reasoning, which begins with data and the intention of making sense of it by theorizing. Abductive reasoning "deals with the logic of discovery. It takes what is surprising (from experience, theory) and makes sense of it (a type of theorizing)" (Shields and Whetsell, 2017, p. 84). With its emphasis on surprise and synthesis, abduction, is associated with creativity and innovation (Timmermans & Tavory, 2012). In practice, inductive, deductive and abductive logic support each other and inform a larger pattern of inquiry. For example, a deep dive into data can reveal patterns (inductive) these patterns are transformed into hypotheses, which are

tested using new data sets (deductive). Surprises in each investigation can reveal unexpected connections that inform the next stage of theory development or data collection (abduction).

Research Paradigms[3]

Empirical investigation relies on three types of methodology – Quantitative, Qualitative and Mixed Methods. We explore each in more depth as a way to show when and how working hypotheses fit in the larger scheme. In order to draw out key distinctions more clearly, the discussion ignores many of the nuances that make each methodology an important part of social science. Also, it should be noted that most scholars who do empirical research, learn statistics and other methodology but probably pay little attention to the philosophical assumptions that underlie it. Hence, the alignment between philosophy and practice is uneven. The next section reflects the discourse primarily in methodology related journals.

Quantitative Methods

Quantitative analysis, which is informed by positivistic philosophies, dominates high impact journals (Twining et al., 2017). Quantitative methods use deductive logic and formal hypotheses or models informed by hypotheses as mechanisms to explain, predict, and eventually establish causation (Hyde, 2000; Kaplan, 1964, Johnson and Onwuegbunzie, 2004, Morgan, 2007)[4]. The correspondents between the conceptual and empirical world make measures possible. Measurement assigns numbers to objects, events or situations and allows for

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[3] Purists who believe in using the term paradigm as defined by Thomas Khun (1964) would dispute the use of "paradigm" to distinguish quantitative, qualitative and mixed methods research. Nevertheless, the term paradigm is commonly used to distinguish and define each methodology in the research methodology scholarly literature (Morgan, 2007; Johnson and Onwuegbunzie, 2004; Johnson et al, 2007).

[4] It should be noted that quantitative researchers often use inductive reasoning. They do this with existing data sets when they run correlations or regression analysis as a way to find relationships. They ask, what does the data tell us?

standardization and subtle discrimination. It also allows researchers to draw on the power of

mathematics and statistics (Kaplan, 1964, pp. 172-174). Using the power of inferential statistics,

quantitative research employs research designs, which eliminate competing hypotheses and is

high in external validity or the ability to generalize to the whole. The research results are

relatively independent of the researcher (Johnson & Onwuegbunzie, 2004).

Quantitative methods are dependent on the quality of measurement and a priori

conceptualization, and adherence to the underlying assumptions of inferential statistics. Critics

charge that hypotheses and frameworks needlessly constrain inquiry (Johnson and

Onwuegbunzie, 2004, p. 19). Abraham Kaplan's (1964) example of the drunk looking for his lost

keys under the lamp post failing to consider places outside the light is apt here. The tools and

assumptions of quantitative research blind the researcher to evidence outside the reach of

quantitative tools.

Qualitative Methods

Qualitative researchers who embrace the post-modern, interpretivist view,[5] question

everything about the nature of quantitative methods (Willis, 2007). Rejecting the possibility of

objectivity, correspondence between ideas and measures, and the constraints of a-priori

theorizing they focus on "unique impressions and understandings of events rather than to

generalize the findings" (Kolb, 2012, 85). Characteristics of traditional qualitative research

include "induction, discovery, exploration, theory/hypothesis generation and the researcher as

the primary 'instrument' of data collection" (Johnson & Onwuegbunzie, 2004, p. 18). It also

concerns itself with forming "unique impressions and understandings of events rather than to

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[5] Qualitative researchers are also associated with other post-modern philosophies such as phenomenology, hermeneutics, naturalistic inquiry and constructivism.

generalize findings" (Kolb, 2012, 85). The data of qualitative methods are generated via interviews, direct observation, focus groups and analysis of written records.

Qualitative methods provide for understanding and "description of peoples personal experiences of phenomena." They enable descriptions of detailed "phenomena as they are situated and embedded in local contexts." Researchers use naturalistic settings to "study dynamic processes" and explore how participants interpret experiences. Qualitative methods have an inherent flexibility, allowing researchers to respond to changes in the research setting. "Qualitative data in the words and categories of participants lend themselves to exploring how and why phenomena occur." They are particularly good at narrowing to the particular and on the flipside have limited external validity (Johnson and Onwuegbunzie, 2004, 20). Instead of specifying a suitable sample size to draw conclusions, qualitative research used the notion of saturation (Morse, 1995).

Grounded theory, introduced by Glaser and Strauss in 1967, is a well-known interpretivist qualitative research method. This "grounded on observation" (Patten, 2000, p. 27) methodology, focuses on "the creation of emergent understanding" (O'Connor et al 2008, p. 30). It uses the Constant Comparative method, whereby researchers develop theory from data as they code and analyze at the same time. Data collection, coding and analysis along with theoretical sampling are systematically combined to generate theory (Kolb 2012, p. 83).[6]

Most quantitative research is purposeful (explanation/prediction) whereas purist in qualitative research reject purposeful inquiry. Like qualitative research, working hypotheses are

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[6] There is no guarantee of theoretical innovation. Take for example a study highlighted by Earl Babbie (2007) in his best-selling *The Practice of Social Research.* Here Jobs et al (1996) examined shopping in Romania as a social problem in an economy evolving toward capitalism. The authors discovered, consistent with the law of demand in economics, that a lack of money was a problem (clearly less than an innovative theoretical discovery).

well suited for using evidence such as interviews and direct observation, which are not reduced to numeric measures and lend themselves to particular phenomena. Research using working hypotheses, consistent with quantitative methods, is deductive, explicitly purposeful and employs a conceptual framework (Shields and Rangarajan, 2013, Shields and Tajalli, 2006).

A close look at the two philosophies and assumptions of quantitative and qualitative research suggests two contradictory world views. This rigid dichotomy is known as the *Incompatibility Theory* which sets up a quantitative versus qualitative tension very much like the seeming separation of art and science or fact and values. (Smith 1983, 1983a; Guba, 1987; Smith and Heshusius, 1986; Howe, 2019). Ironically, the case study methodology (clearly linked to qualitative methods) championed by the highly influential, Robert Yin (2017, 2011, 1992, 1981) showcases a qualitative, deductive research methodology that crosses boundaries between positivist and interpretivist.

"The painter and the poet like the scientific inquirer know the delights of discovery" (Dewey 1934, p. 139).

Mixed Methods

Turning the "Incompatibility Theory" on its head, Mixed Methods research "combines elements of qualitative and quantitative research approaches … for the broad purposes of breadth and depth of understanding and corroboration" (Johnson et al., 2007, p. 123). It does this by partnering with philosophical pragmatism.[7] Pragmatism is productive because "it offers an immediate and useful middle position philosophically and methodologically; it offers a practical and outcome-oriented method of inquiry that is based on action and leads, iteratively, to further action and the elimination of doubt; it offers a method for selecting methodological mixes that

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[7] See Feilzer, 2010; Howe, 2019; Johnson & Onwuegbunzie 2004; Morgan, 2007; Onwuegbunzie & Leech 2005; Biddle and Schafft, 2015.

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can help researchers better answer many of their research questions" (Johnson and Onwuegbunzie, 2004, p. 17). What is theory for the pragmatist "Any theoretical model is for the pragmatist, *nothing more than a framework through which problems are perceived and subsequently organized*" (Horthersall, 2018, p. 5).

David Brendel (2009) constructed a simple framework to capture the core elements of pragmatism. Brendel's four "p's – practical, pluralism, participatory and provisional help to show the relevance of pragmatism to mixed methods. Pragmatism is purposeful and concerned with the *practical* consequences. The *pluralism* of pragmatism overcomes the quantitative/qualitative dualism. Instead, it allows for multiple perspectives (including positivism and interpretivism) and, thus, gets around the incompatibility problem. Inquiry should be *participatory* or inclusive of the many views of participants, hence, it is consistent with multiple realities and is also tied to the common concern of a problematic situation. Finally, all inquiry is *provisional*[8]. This is compatible with experimental methods, hypothesis testing and consistent with the back and forth of inductive and deductive reasoning.

Advocates of mixed methods research note that it overcomes the weaknesses and employs the strengths of quantitative and qualitative methods. Quantitative methods provide precision. The pictures and narrative of qualitative techniques add meaning to the numbers. Quantitative analysis can provide a big picture, establish relationships and its results have great generalizability. On the other hand, the "why" behind the explanation is often missing and can be filled in through in-depth interviews. A deeper and more satisfying explanation is possible.

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[8] It should be noted that we have also argued elsewhere that it also makes sense to apply the philosophy of pragmatism to public administration. See Shields (1996), Shields (2003), Shields (2008), Shields (2005), Salem and Shields (), Whetsell and Shields (), Brom and Shields (2006), Bartle and Shields (2013), Whetsell and Shields (2011)

Mixed-methods brings the benefits of triangulation[9] or multiple sources of evidence that converge to support a conclusion. It can entertain a "broader and more complete range of research questions" (Johnson & Onwuegbunzie, 2004, p.21) and can move between inductive and deductive methods. Case studies use multiple forms of evidence and are a natural context for mixed methods.

One thing that seems to be missing from mixed method literature and explicit design is a place for conceptual frameworks. For example, Heyvaert et al (2013) examined nine mixed methods studies and found an explicit framework in only two studies (transformative and pragmatic) (p. 663).

> "So, he killed her, washed the knife and himself, took a knife from the kitchen . . . Is that how you see it?"
>
> "*It's a **working hypothesis.**"* (p. 310)
>
> Yet she knew that Dalgliesh was right in not hurrying Mrs. Buckley. She had information they needed, and too many *inquiries go wrong*, Kate knew, because the police had *acted in advance of the facts* (p. 367) (italics added). P. D. James, *A Certain Justice* (1999)

Legal Reasoning and Evidence – An Example

For the most part the study of the law and research methods are in silos that do not intersect. In public policy and administration, law and research methods intersect around the role of evidence. Laws authorize policy. In addition, evidence and how to assess evidence are crucial as problems occur and decisions need to be made.   For law, evidence can be framed and assessed using something like a working hypothesis as suggested in the P.D. James quote above. It should be noted that many legal decisions are decided using precedent and interpretation of an original document like a constitution. This is a comparison we are not making. We focus on a

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[9] More recently, triangulation has been expanded as a way to broaden the perspective and accommodate divergent findings within a comprehensive framework (Howe, 2012).

different context, International Customary Law. Here the language and concepts of quantitative and qualitative methods are pervasive (Worster, 2013).

International law often does not have a document or overarching legal framework like a constitution from which to use precedent in decisions. So, it often applies empirical research. Legal reasoning, ways of examining evidence and making judgments, sometimes uses the logic and methods of social scientific inquiry. Qualitative research is about amassing evidence and making a case that the data tells you something. Sometimes, like in the case of Customary International Law, legal standards are used to evaluate the evidence. Customary International Law employs a deductive logic and tests hypotheses through sampling and "amassing evidence" (Worster, 2013, p. 445).

Customary International law uses two standards of evidence: State Practice and *opinio juris*. State Practice "consists of the highly consistent acts of a widespread number of states manifesting a certain behavior. *Opinio juris* is the belief on the part of the states manifesting the relevant behavior that they are compelled to act as they do" (Worster, 2013, p. 448). These two criteria are similar to working hypotheses. If the evidence meets the test of State Practice and *Opinio Juris* then a custom can be accepted as customary law. "[T]he degree to which the conclusion is probably true is based on the quality of the evidence" that State Practice and *opinio juris* can be documented and proof established. "Arguments with significant evidence are said to be strong and those without it are said to be weak… thus no conclusion … is certain, instead it is probable to a degree of certainty" (Worster, 2013, p. 456). Central to this methodology is the forming of hypotheses, but these hypotheses are not explanatory or causal. And, instead of saying there is evidence to support the hypothesis the test for law is evidence that provides proof (p. 469). To reiterate, this legal process employs the language and methods of hypothesis testing.

But the hypotheses that frame the data collection do not test causal relationships. Rather, the evidence is compared to standards.

International Customary law cases are very similar to "case study" methodology that uses deductive logic. Whereas Yin (1994) includes "propositions and hypotheses" in the discourse of the case study, Customary International Law cases are explicitly framed by non-relational, standards transformed into "working"[10] hypotheses. In addition, these standards (hypotheses) are employed in multiple cases and allow for some consistency across countries and time. This characteristic has relevance for comparative policy analysis. According to Yin (1994, p. 25) the linking of "data to propositions, and the criteria for interpreting the findings" are the least well-developed procedures in case study research. This is even more challenging for exploratory and descriptive research, which do not have hypotheses/propositions (Baskarada, 2014, p. 4). We contend that for deductive, exploratory research, something akin to the hypothesis (we call it working hypothesis) or propositions used in International Customary Law could play a framing role similar to the formal hypothesis of quantitative research.

Where is and What is Theory?

In the deductive world of quantitative research, theory generally focuses on explanations around observations. Theory is a "collection of ideas about how and why variables are related" (Graziano and Raulin, 2013, p. 450). Relationships between variables are generally summarized by hypotheses. Paul Oppenheim and Hilary Putman (1958) note that "by a 'theory' (in the widest sense) we mean any hypothesis, generalization or law (whether deterministic or statistical) or any conjunction of these" (p. 25). Stephen Van Evera (1997) uses a similar and more complex definition "theories are general statements that describe and explain the causes of effects of

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[10] We introduce the term "working" hypothesis as a way to distinguish it from formal hypotheses that are linked to statistical tests.

classes of phenomena. They are composed of causal laws or hypotheses, explanations, and antecedent conditions" (p. 8). In the remainder of this paper, we consider a hypothesis as a kind of theory. We recognize that not all definitions of theory would put hypotheses at the center, but for purposes of our argument, we consider hypotheses as an important but not unique form of theory.

We employ a version of theory that is consistent with Dewey's pragmatism. Dewey (1938) treats theory as a tool of empirical inquiry and uses a map metaphor (p. 136). Theory is like a map that helps a traveler navigate the terrain – and should be judged by its usefulness. "There is no expectation that a map is a true representation of reality. Rather, it is a representation that allows a traveler to reach a destination (achieve a purpose). Hence, theories should be judged by how well they help resolve the problem or *achieve a purpose*" (Shields and Rangarajan, 2013, p. 23). Note that we explicitly link theory to the research purpose.

Theory is never treated as an unimpeachable Truth, rather it is a helpful tool that organizes inquiry connecting data and problem. Dewey's approach also expands the definition of theory to include ideas and abstractions outside of causation and explanation. Chemistry's periodic table *describes* the elements and is an example of a categorical theory. In social science and education Bloom's (1956) Taxonomy (categories) of the Cognitive Domain is also a theory without hypotheses (Shields and Rangarajan, 2013, 23-24).

The highly rated journal, *Computers and Education*, created guidelines for qualitative research as a way to improve soundness and rigor. They identified the lack of alignment between theoretical stance and methodology as a common problem in qualitative research. In addition, they identified a lack of alignment between methodology, design, instruments of data collection

and analysis. *Computers and Education* created a guidance summary, which emphasized the need to enhance coherence throughout elements of research design (Twining et al., 2017, p. 12).

In other books and articles[11], we have used Dewey's (1938) notion of theory as tool to address the problem of coherence across multiple stages of research design. We did this by showing how close-to-the-data, micro-conceptual frameworks can be fruitfully linked[12] to other components of the research process. We define micro-conceptual frameworks as the *"way the ideas are organized to achieve the project's purpose"* (Shields and Rangrajan, 2013, p. 24).[13] Again, the research purpose plays a pivotal role in the functioning of theory. Surprisingly, the literature on mixed methods and pragmatism ignores the role of "purpose" in its larger discussion.

A Framework for micro-Conceptual Frameworks

We begin our examination of micro-conceptual frameworks with Earl Babbie's (2007) three generic, broadly applicable research purposes – explanation, exploration and description. Explanatory research is framed by hypotheses. Explanatory research answers the "why" question (Babbie, 2007, 89-90). For example, why do some cities have higher incidence of residential fires? The possible answers to this question (longer winters, more abandoned buildings) become

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[11] See Shields, 1999; Shields and Tajalli, 2006; Shields and Rangarajan, 2013; Shields and Whetsell, 2014; and Shields and Whetsell, 2017.

[12] It should be noted that the term conceptual framework is common in scholarship in both science ans social science. The term has many possible meanings and is often applied at the macro scale. This is why we distinguish our "tool" using the term "micro" to preface conceptual framework.

[13] It should be noted that we became aware of the problem of alignment in empirical research as we tried to supervise masters level students doing their capstone projects known as Applied Research Projects. Review by an accreditation site visit team pointed out the problem making it impossible to ignore. The insights from Table 1 have helped us to show students how to achieve coherence in their empirical work across different aspects of the research process. Once we began to use this system, our student papers jumped in quality and began winning regional and national awards. The process has also been easier to supervise because once the conceptual framework and research purpose is established, other parts of the design become immediately clearer (at least for the professor). This ensures we are consistent in our supervision across the two semester process. See Shields and Rangarajan, 2013 and Shields and Tajalli, 2006 to learn about the connection to student papers.

hypotheses that can be tested empirically to answer the "why" question.[14] The hypotheses connect to the research question/purpose and provide guidance for other parts of the research process (variable construction, choice of data, statistical tests), which enhances alignment.

We claim that hypotheses are a ubiquitous framework for conceptualizing deductive empirical studies – yet, clearly, relational hypotheses are not suited to descriptive studies and may not be fruitful for exploratory studies. Unlike the hypotheses of explanatory studies, description and exploration do not have a similar widely recognized, corresponding framework (or theoretical tools that can address the alignment question). We propose categories as the framework for the descriptive purpose and working hypotheses for exploratory studies. In Table 1 we outline a system of purpose/framework pairing that can be used to address the alignment issue identified as problematic in *Computers and Education* (Twining et al., 2017). Table 1 shows how purpose-framework coupling connects to data collection and analysis. Columns three and four demonstrate how different kinds of data collection modalities and data analysis systems (e.g., inferential statistics) align with a given purpose/framework pairing.

The table sets a kind of contextual stage for a discussion of working hypothesis and its companion. We are not claiming that the frameworks, purposes and philosophic orientations depicted in Table 1 are exhaustive. Rather, Table 1 reveals the conditions under which working hypotheses make sense as a framework that can enhance alignment across research purpose, type of methodology, data analysis and interpretation of findings (Shields and Whetsell, 2017). Note that the table should be read horizontally. It emphasizes *alignment* or the connections between the activities and stages in the research process. This table presents a methodological system for

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[14] See Huang (2009) for a closer look at this question.

purposeful, deductive research, which explicitly includes micro-conceptual frameworks and *emphasizes alignment* in the research process (Shields and Whetsell, 2017, 84).

Table 1 Integrating Micro-Conceptual Frameworks

Deductive Logic				
Type of Purpose	**Micro-Conceptual Framework**	**Methodology**	**Data Analysis**	**Primary philosophical underpinning**
Explanatory	Formal Hypotheses	Quantitative, experimental design, survey, time series, existing data	Inferential statistics	Positivism
Descriptive	Categories	Quantitative, survey, content analysis	Simple descriptive statistics	Positivism
Exploratory (1)	**Working Hypotheses**	**qualitative, mixed methods, case study**	**Evidence of all types may or may not use statistics**	**Pragmatism**
Exploratory (2)	Pillar Questions	qualitative, mixed methods, case studies	Evidence of all types may or may not use statistics	Pragmatism
Gauging	Practical Ideal Type	qualitative, mixed methods, case studies	Evidence of all types may or may not use statistics	Pragmatism
Decision Making	Models of Operations Research	Cost Benefit analysis, Cost Effectiveness Analysis, linear programing etc.	Quantitative techniques of operations research	Positivism
Inductive Logic				
Experiential Understanding		Qualitative	Thick description	Interpretivist
	Grounded theory	Qualitative	Constant Comparative	Interpretivist
Description		Qualitative	Generating categories	Interpretivist

For public administration and policy, the three purposes commonly associated with empirical research (Babbie, 2007; Baskarada, 2014) are too limiting. We added a "gauging" research purpose and paired it with the practical ideal type micro-conceptual framework[15]. Gauging research uses a logic of rating to determine how close a process or practice is to an ideal

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[15] In this case, one can look to the insights from the International Customary Law. The court gauges whether the evidence supports the claim that a certain practice meets the State Practice and *opinio juris* standards necessary to be considered customary law

or standard. This kind of logic is used by college professors as they grade papers and when accreditation teams compare MPA Program practices to accrediting standards. Process evaluation can also uses a similar logic (Carol et al, 2007).

While the explanatory and descriptive purposes are compatible with positivism and quantative analysis, exploratory research is consistent with pragmatism, qualitative methods and mixed methods. The working hypothesis, and derivative micro-conceptual framework, pillar questions are the focus of the remainder of the paper.[16]

> *Too often the hypotheses with which we work are at home only in the twilight regions of the mind, where their wavering outlines blend into a shadowy background. They are safe from sudden exposure, and are free to swoop down for sustenance on whatever datum comes their way (Kaplan, 1964, p. 268).*

What is a Working Hypothesis? [17]

The working hypothesis is first and foremost a hypothesis or a statement of expectation that is tested in action. The formal hypotheses of explanation highlight relationships between factors or variables. And when used in quantitative research, hypotheses are tested by using data, numeric measures and statistical tests. Working hypotheses, are paired with exploratory research a type of inquiry that is in the preliminary or early stages (Babbie, 2007). To accommodate the preliminary nature of exploratory research "working hypotheses, should be flexible with room for both relational and non-relational expectations as well as qualitive evidence and quantitative measures" (Shields and Rangrajan, 2013, p. 111).

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[16] It should be noted that Table 1 also includes an additional positivist purpose/framework pairing (decision making and models of operations research). These incorporate common quantitative, empirical research techniques like Cost Benefit Analysis, Cost Effectiveness Analysis and Linear Programing. In addition, Table 1 incorporates inductive reasoning. Here there is either no purpose or no framework. Grounded Theory is considered a type of framework, but this is only in the loosest of senses. The methods used are qualitative and the data analysis includes things like thick descriptions and theory construction. Epistemologically, qualitative inductive research is in the interpretavist camp.

[17] The earliest usage of "Working Hypothesis" we could find was in an 1805 *Monthly Review* article, which specified a "wonder-working hypothesis" about Bituminous fermentation in its review of James Parkinsin's 1804 book *Organic Remains of a former World.*

The term "working" suggest that these hypotheses are subject to change or provisional and the possibility of finding contradictory evidence is real. In addition, a "working" hypothesis is active, it is a tool in an ongoing process of inquiry. It "works" to move purposeful inquiry forward. "Working" also implies some sort of community, mostly we work together in relationship to achieve some goal. The term working hypothesis appears to have a kinship with pragmatism.

Indeed, both pioneering pragmatists, John Dewey and George Herbert Mead use the term working hypothesis in important 19th century works. Most notably, John Dewey (1896), in one of his most pivotal early article ("Reflex Arc"), used "working hypothesis" to describe a key concept in psychology. "The idea of the reflex arc has upon the whole come nearer to meeting this demand for a *general working hypothesis* than any other single concept (Italics added)" (p. 357). George Herbert Mead (1899) used working hypothesis in a title of an *American Journal of Sociology* article "The *Working Hypothesis* and Social Reform" (italics added)[18]. For both Dewey and Mead, the notion of a working hypothesis has a self-evident quality and it is applied in a big picture context.[19]

Dewey was 37 when he wrote the Reflex Arc article. Forty-two years later, in *Logic the Theory of Inquiry*, he developed the notion of a working hypothesis that operated on a smaller

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[18] This quote from Mead (1899, p. 370) is suggestive of the provisional nature of working hypotheses. A scientist's foresight goes beyond testing a hypothesis. "Given its success, he may restate his world from this standpoint and get the basis for further investigation that again always takes the form of a problem. The solution of this problem is found over again in the possibility of fitting his hypothetical proposition into the whole within which it arises. And he must recognize that this statement is only a working hypothesis at the best, i.e., he knows that further investigation will show that the former statement of his world is only provisionally true, and must be false from the standpoint of a larger knowledge, as every partial truth is necessarily false over against the fuller knowledge which he will gain later."

[19] In 1958, Philosophers of Science, Oppenheim and Putman use the notion of Working Hypothesis in their title "Unity of Science as Working Hypothesis." They too, use it as a big picture concept, "unity of science in this sense, can be fully realized constitutes an over-arching meta-scientific hypothesis, which enables one to see a unity in scientific activities that might otherwise appear disconnected or unrelated" (p. 4).

scale. He defines working hypotheses as a "provisional, working means of advancing investigation" (Dewey, 1938, 142). Abraham Kaplan (1964), another methodologist whose work is informed by classical pragmatism,[20] used a conception of working hypotheses that are employed on a smaller scale. Working hypotheses "serve to guide and organize the investigation, providing us something to go on with. The working hypothesis is not a guess at the riddle, a hunch as to what the answer might be. It is an idea, not about the outcome of inquiry but about the next steps that may be worthy of taking. The working hypothesis formulates a belief pertaining to the course of inquiry but not necessarily pertaining to its ultimate destination" (p. 88). Kaplan's definition suggests that working hypotheses would be useful toward the beginning of a research project (e.g., exploratory research).

In Table 1 we paired working hypotheses with the research purpose exploration because as Earl Babbie (2007) notes, exploration is used when researchers "start to familiarize" themselves with a topic and "typically occurs when a researcher examines a new interest or when the subject of study itself is relatively new" (p. 88). Exploration is widely applicable because all research topics were once "new." Further, all research topics have the possibility of "innovation" or ongoing "newness." The point here, of course, is that the exploratory purpose is far from trivial[21].

One way to look at hypotheses is that they are the *expected* answers to a question. For explanatory research the question is relational. For example, the question how does education influence income could be converted to an "expected" answer (or, Hypothesis) --"education has

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[20] Kaplan (1964, p.xv) in the preface of the *Conduct of Inquiry* specifically notes his extensive debt to Peirce, Dewey and James.

[21] It should be noted that the difference between explanation and exploration is not set in stone. One persons sense of the preliminary might be another's "fairly far along." We are treating these two categories as useful distinctions, nothing more.

a positive effect on income". Exploratory research begins with a less well articulated questions which can be converted to "expected" answers.[22]

Before we move forward with a more theoretical and philosophical discussion some examples are in order[23]. In the first example, working hypotheses were used to *explore* sexual harassment training in an agency. James Swift (2010) uses Lundvall's (2006) knowledge taxonomy (*Know-what, Know-how, Know-why and Know-who*) to determine the types of knowledge that should be included in his agency's sexual harassment training. He considered his training assessment study as exploratory because his agency had never analyzed their sexual harassment training practices to date.

Table 2 illustrates how working hypotheses are often constructed in a layered manner. Each working hypothesis has a set of sub-hypotheses, which are more specific and easily linked to the data collection mechanisms. Swift used the categories Know-what, Know-how, Know-who and Know-why to formulate his working hypotheses. Just what kind of Know-how knowledge (WH2) made sense for sexual harassment training was established through the literature[24]. Here he looked for the "skills" that should be included in the training. His sub-hypotheses included how to file and report a claim of harassment (WH2a), document sexual harassment situations (WH2b), investigate sexual harassment complaints (WH2c), and follow harassment policy procedures (WH2d).

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[22] Note, these expected answers are provisional, working answers!
[23] For another example applied to comparative policy analysis see Casula (2018).
[24] Swift (2010) also drew from his experience as an Equal Employment Opportunity Officer at Capital Metro and his 14 years of experience in human resources.

Table 2 – Working Hypotheses – Applied Research Example
Example Illustrating a set of Working Hypotheses as a framework for assessing sexual harassment training.

WH1: Capital Metro provides adequate *know-what* knowledge in its sexual Harassment training
        WH1a: The sexual harassment training includes information on anti-discrimination laws (Title VII).
        WH1b: The sexual harassment training includes information on key definitions.
        WH1c: The sexual harassment training includes information on Capital Metro's Equal Employment
                Opportunity and Harassment policy.
        WH1d: Capital Metro provides training on sexual harassment history.

WH2: Capital Metro provides adequate *know-how* knowledge in its sexual Harassment training.
        WH2a: Training is provided *on how* to file and report a claim of harassment
        WH2b: Training is provided *on how* to document sexual harassment situations.
        WH2c: Training is provided *on how* to investigate sexual harassment complaints.
        WH2d: Training is provided on *how to* follow additional harassment policy procedures protocol

Swift (2010) used two additional working hypotheses dealing with *know-why* and *know-who* knowledge not shown here.
This table is adapted from Swift (2010) conceptual framework table (p. 38). The actual conceptual framework table incorporated the literature used to support the hypothesis or sub-hypothesis

Something akin to working hypotheses are hidden in plain sight in the professional literature. Take for example Kerry Crawford's (2017) book *Wartime Sexual Violence.* Here she explores how basic changes in the way "advocates and decision makers think about and discuss conflict-related sexual violence." She focused on a subsequent shift from silence to action. The shift occurred as wartime sexual violence was reframed as a "weapon of war". The new frame captured the attention of powerful members of the security community who demanded, initiated, and paid for institutional and policy change. Crawford (2017) examines the legacy of this key reframing. She develops a six-stage model of potential international responses to incidents of wartime violence. This model is fairly easily converted to working hypotheses and sub-hypotheses. Table 3 shows her model as a set of (non-relational) working hypotheses. Table 3 shows her model as a set of (non-relational) working hypotheses. She applied this model as a way to gather evidence among cases (e.g., the US response to sexual violence in the Democratic Republic of the Congo) to show the official level of response to sexual violence.

Table 3
Example Illustrating a Set of Working Hypotheses as a framework for comparative case studies.
Stages of Potential International Response to Sexual Violence*

WH1: Nonrecognition or on action to prevent sexual violence during conflict
    WH1a: Sexual violence is not recognized as part of a specific conflict or the conflict itself is not recognized.
    WH1b: Wartime sexual violence as a general issue is not recognized
    WH1c: No action is taken, and no formal discussion occurs within or among International Organizations (IO).

WH2: Sexual Violence is documented during a conflict and learning occurs.
    WH2a: Sexual violence as an aspect of a conflict is the subject of a report, publication, study or conference attended by a state or IO.
    WH2b: Information gathering about sexual violence during a conflict occurs

H3: There is a rhetorical response and condemnation of sexual violence during a conflict.
    WH3a: Sexual violence as part of a specific conflict is subject of a speech, unprompted remarks or press release of a high-ranking state official or leader of an IO.
    WH3b: Rhetorical remarks occur but resources to reduce or study sexual violence are not committed.

Three additional stages of international response were provided by Crawford (2017)
* This table was constructed adapting Table 1.1 of Crawford's (2017) book *Wartime Sexual Violence*.

Where do working hypotheses come from?

If working hypotheses are expected answers to a preliminary question, where do the questions and answers come from? For scholars informed by Dewey's pragmatism, working hypotheses come from the nexus of the literature review, experience and reflective thought.[25] Kaplan (1964) maintains that the traditional "hypothetico-deductive method of inquiry associated with behavioral science methodology is problematic because most of the important incidents in the drama of science are enacted behind the scenes" (p. 10). One of the behind the scenes aspects of deductive empirical research is the literature review. The answers to the questions (working hypotheses) emerges from a review of the literature that uses inductive and abductive logic. Both Pierce and Dewey have insight into how to approach the problem of finding a framework.

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[25] Ideally, all deductive frameworks, including formal hypotheses and descriptive categories, originate in a literature review.

"Fixated" habits of mind "impervious to fresh evidence" stunt inquiry (Weiner, 1958, p. 91). Doubt is the "uneasy and dissatisfied state from which we struggle to free ourselves and pass onto the state of belief" (Peirce 1877)   Peirce viewed inquiry as part of a cycle, which begins with belief, moves through surprise and doubt, returning to belief (Peirce 1877). William James (1893) used a bird's flight and perch metaphor to capture the same thing (p. 160). Thus, a literature review may begin with familiar ideas but if productive, surprise and doubt will motivate further exploration and reflective thought (Peirce, 1905, 484).

Real and felt doubt opens the doors to reflective thought. According to Dewey (1910, p. 80) "to think means … to bridge a gap in experience, to bind together facts or deeds otherwise isolated." Reflection opens people to consider facts that do not correspond to their existing belief system (Peirce, 1878). Thus, the literature review, particularly for exploratory research, should be a place where reflective thought combines with inductive and abductive logic to inform the construction of the deductive framework.

Working hypotheses (expected answers to the research questions) should be constructed using evidence and arguments from the literature informed by experience. They should be constructed so that it is possible to articulate what kind of evidence would support the expected answer and what kind of evidence would not support the working hypothesis (See Tables 2 and 3). Generally, particularly if it is within the context of a case study, multiple forms of evidence can be established as supporting (or not supporting) the working hypothesis (Shields and Tajalli, 2006). The approach to evidence is similar to the logic and practice of customary international law (Worster, 2013).

Once the hypotheses are specified, the next steps use the working hypotheses to identify the kinds of evidence needed to test the hypothesis. When expected evidence is linked to the sub-

hypotheses, data, framework and research purpose are aligned. This can be laid out in a planning document that operationalizes the data collection in something akin to an architect's blueprint. This is where the scholar explicitly develops the *alignment* between purpose, framework and method.

Table 4 outlines a possible operationalization table that could flow from James Swift's framework. Sub-hypotheses are specified in column one and the data collection method (interviews, document analysis etc.) are specified in column two. The specifics, such as interview questions or documents to examine are detailed in column three. For example, (WH2a) the documents (basic training manual and EEO Policy – column 2) are specified with the direct question (column 3) How well do the documents cover "how-to" file a report on sexual harassment." Interviews with participants and managers (column 2) are linked with the interview question "How well does the sexual harassment training prepare participants to file a claim?" (column 3). In the less precise world of qualitative data, evidence supporting a hypothesis could have varying degrees of strength. This too can be specified. It should be noted that the working hypothesis and the corresponding data collection protocol does not stop inquiry and fieldwork outside the framework. It does, however, provide a very loose and perhaps useful way to make sense of the data because the new information "surprisingly" is outside the framework vetted by the literature. This opens the way for abductive logic and theory development.

Table 4 Example of Operationalization Table for Working Hypotheses

Working Hypothesis	Method of data collection	Evidence/criteria
WH1: Capital Metro provides adequate *know-what* knowledge in its sexual Harassment training		
WH1a: Capital Metro provides training on anti-discrimination laws (Title VII).	Interview supervisors and managers Interview participants Document Analysis 1) Capital Metro EEO Basic training manual 2) Capital Metro EEO Policy	How does the sexual harassment training address anti-discrimination laws? Additional questions as appropriate. What did you learn about anti-discrimination law? Additional questions as appropriate. How do these documents address history of discrimination laws?
WH1b: Capital Metro provides training on sexual harassment definitions.	Interview supervisors and managers Interview participants Document Analysis 1) Capital Metro EEO Basic training manual 2) Capital Metro EEO Policy	How does the sexual harassment training address key definitions? Additional questions as appropriate What definitions about sexual harassment did you learn? Additional questions as appropriate. Which definitions can be found in these documents?
WH1c: and WH1d	Data collection methods	Further specification of evidence used
WH2: Capital Metro sexual harassment training provides adequate "know how" training		
WH2a: Capital Metro provides training on *how-to* file and report a claim of harassment	Interview supervisors and managers. Interview with participants Document Analysis 1) Capital Metro EEO Basic training manual 2) Capital Metro EEO Policy	How well does the sexual harassment training prepare participants to report a claim? Additional questions as appropriate. How well did the sexual harassment training prepare you to report a claim? Additional questions as appropriate. How well do the documents cover how-to file a report of sexual harassment?
WH2b: Capital Metro provides training on *how to* follow Capital Metro harassment policy procedures protocol.	Interview of supervisors and managers Interview participants Document Analysis 1) Capital Metro EEO Basic training manual 2) Capital Metro EEO Policy	How does the sexual harassment training address how to file and report a complaint? Additional questions as appropriate. How well did the training cover how to file a complaint? Additional questions as appropriate. Do these documents address how to file and report a complaint?
Wh2c & d	Data collection methods. Etc.	Specify further evidence used.

Pillar Questions

Occasionally scholars find a topic that is yet so new and unstructured that even after a careful literature review and with field experience they are a loss to articulate working hypotheses or expected answers. In these instances, a way to frame a research problem even more unstructured than working hypotheses is needed. The *Pillar Question* framework evolved as a solution to this dilemma.

Since a hypothesis is nothing more than an anticipated answer to a question. Why not move one step back and just articulate the key questions. "*Pillar questions are the questions imbedded in working hypotheses absent an anticipated answer*" (Shields and Rangarajan, p.148). Pillar questions provide an even more flexible way to bring some structure to a problematic situation. They add focus by limiting the scope of inquiry to "pillar" issues, discovered through the literature review and/or experience. There is no pretense, however, that the "pillar" issues are anything more than starting points. We consider them pillar because they "support and provide structure for an early view of the problem" (Shields and Rangarajan, 2013 148). Pillar questions provide flexibility and at the same time reduce uncertainty that enables them to help align the literature review, framework, data collection and analysis. See Table 5 for an example of Pillar Questions as a framework.

Travis Whetsell (2011) was asked to do a preliminary assessment of a very new Texas program designed to address child support issues among veterans. He asked questions around three broad issues, 1) the characteristics of the non-custodial, parent-veteran, 2) bureaucratic obstacles to child support enforcement and 3) responsiveness. Again, each broad Pillar Question was followed by sub-questions. He also developed an operationalization table using the pillar questions and sub-questions as a guide

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Table 5 Example of Pillar Questions
Research Purpose: to conduct a preliminary exploration and evaluation of the HEROES Program
WH1: Wat are the pertinent *characteristics* of the non-custodial parent-veteran?
WH1a: What is the role of ability to pay in child support enforcement among veterans under the outreach of the HEROES Program?
WH1b: What is the role of Post-Traumatic Stress Disorder in child support enforcement among veterans under the outreach of the HEROES* Program?
WH2: What are the bureaucratic obstacles to child support enforcement among veterans under the HEROES Program?
WH2a: How do interstate orders affect child support enforcement among veterans under the outreach of the Heroes Program?
WH2b: How does the HEROES Program cooperate with intrastate agencies and organizations?
WH3: What factors affect the responsiveness of child support orders among veterans under the outreach of the HEROES Program?
WH3a: What are the obstacles to modification of child support orders for veterans under the outreach of the HEROES Program?
WH3b: What is the role of guidelines in child support enforcement among veterans under the outreach of the HEROES Program?
The HEROES Program dealt with child support and enforcement issued among Texas active duty service members and veterans. Whetsell (2011) explored the program's approach to veterans' issues.

Conclusion

Over the past 20 years hundreds of Texas State students have used working hypotheses to structure their case study, exploratory, Capstone papers (Applied Research Projects).[26] We published several works that discuss Working Hypotheses as an applied, theoretical tool.[27] This paper steps back providing an indepth examination of the Working Hypotheses that took into account philosophical questions and the larger formal research methods literature. It shows how the Working Hypothesis is an addition to this literature. The Working Hypothesis fills a unique knitch in the methods literature. It provides a way to enhance alignment in deductive, exploratory studies.

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[26] These projects are posted to the Texas State University digital repository
https://digital.library.txstate.edu/handle/10877/105
[27] See Shields (1998); Shields and Tajalli (2006) Shields and Rangarajan (2013), Shields and Whetsell (2014), Shields and Whetsell (2017).

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