Some Philosophical Considerations in Using Mixed Methods in Library and Information Science Research

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Abstract

Mixed methods research (MMR) has been described as the third research paradigm that combines qualitative and quantitative research methods. The mixing of research methods requires an epistemological framework that embraces the "reality" uncovered by different research methods. Three formal ontological categories are introduced for deconstructing the polarized view of reality in objectivism and relativism and for differentiating the nature and characteristics of objective, subjective, and normative validity claims as well as the conditions for

justifying "objectivity" in social research. The characterization of "information" as objective, subjective, and normative-evaluative simultaneously demands the study of conditions of information-related phenomena that may call for mixed methods research in library and information science.

Introduction

Mixed methods research (MMR) has been described as the third research paradigm that combines qualitative and quantitative research methods (Johnson, Onwueghuzie, & Turner, 2007) and may be useful for library and information science research. However, despite the fact that mixed methods research has been discussed and debated in other academic disciplines for decades, Fidel's (2008) content analysis shows that "mixed methods" has not been a familiar term in library and information science research. In fact, the term "mixed methods" cannot be found in the tables of contents in recently published research methods books in library and information science (for example, Connaway & Powell, 2010; Pickard, 2007; Wildemuth, 2009). A search in the Library and Information Science Abstract (LISA) database using the search terms "mixed method*" retrieved only 25 peer reviewed articles published between 2009-2011. Yet, Fidel (2008) claims that much research in library and information science has already adopted mixed methods. She explains, "A MMR study mixes qualitative and quantitative methods. Mixing means that the methods support one another" (Fidel, 2008, p. 269). This view of mixed methods research as the application of both qualitative and quantitative research methods simultaneously or sequentially is common (see, for example,

Greene, 2006; Harrits, 2011; Johnson & Onwueghuzie, 2004; Johnson, Onwueghuzie & Turner, 2007; Modell, 2009; Morse, 2010), although some have suggested that mixed methods research can be a mix of methods within a research paradigm (i.e. qualitative or quantitative research). While mixed methods research has been described as the third research paradigm (Johnson, Onwueghuzie, & Turner, 2007), Morse (2010) points out that "at this time, there is no real consensus regarding mixed method design—not even about what it is" (p. 483).

One burning issue in mixed methods research is the reconciliation of the polarized view of reality in qualitative and quantitative research. Greene (2006) has suggested that the clarification of philosophical assumptions is necessary for constituting a methodology in social inquiry, arguing that "assumptions about the nature of social world (ontology) and about the nature of warranted social knowledge (epistemology)" as well as issues such as "objectivity and subjectivity, the role of context and contingency in social knowing, and the relationship between the knower and the known" (p. 93) should be clarified. Johnson, Onwuegbuzie, and Turner (2007) also recognize the importance of philosophical issues such as the need for a "particular, detailed set of philosophical and methodological positions" (p. 125) in order to address practical issues such as the processes and stages of integrating qualitative and quantitative research. Philosophical issues arise in mixed methods research because, generally speaking, qualitative research is associated with hermeneutics, constructivism, and relativism, and quantitative research is associated with positivism and empiricism. Mixing methods with various epistemological assumptions may implicate the acceptance of "multiple realities"

since the nature of reality presumed in the various theories of knowledge is different.

Lincoln, Lynham and Guba (2011) have observed that quantitative methods are usually objectivist and that hermeneutical methods are subjectivist (Table 1; see also Guba & Lincoln, 1994). Although Lincoln, Lynham, and Guba's (2011) descriptions of the various theories of knowledge and their relations to epistemology and methodology may be biased due to their orientation toward constructivism, their categorization provides insights into the conflicting ontological and epistemological commitments in quantitative and qualitative research. One would wonder, however, whether these relationships are necessary or true? For example, can quantitative methods be applied from a constructivist or hermeneutic perspective? In regard to mixed methods research, what are the ontological and epistemological conditions that may allow for employing both qualitative and quantitative research methods?

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Creswell and Plano Clark (2007) summarize three major "stances" in dealing with the alternative or conflicting worldviews or paradigms in mixed methods research: (a) pragmatism—the research question should be of primary importance regardless of the method or the philosophical worldview that underlies the method; (b) multiple paradigms—the researchers recognize that "different paradigms give rise to contradictory ideas and contested arguments—features of research that are to be honored but cannot be reconciled"; and (c) seeing mixed methods research

strictly as a "method" thus allowing researchers to employ any number of philosophical foundations for its justification and use (pp. 26-27).

In other words, these "stances" avoid the fundamental questions in regard to philosophical and epistemological assumptions in methodology. Assuming that mixed methods research involves the mixing of qualitative and quantitative research, two fundamental methodological issues must be addressed: (a) an epistemological framework that allows for the mixing of qualitative, quantitative, and other methods, and (b) the conditions for evaluating validity in mixed methods research.

Contemplating mixed methods for library and information science research, this paper discusses the *conditions of objectivity* in qualitative and quantitative research as a starting point for the development of an epistemological framework for mixed methods research. However, the discussion of objectivity is not to propose positivist-based validity criteria in mixed methods research; rather, it aims to deconstruct the polarized view of reality as interpreted in quantitative and qualitative methods, i.e., "objectivist" and "relativist" (or "subjectivist") respectively (Guba & Lincoln, 1994; Lincoln, Lynham & Guba, 2011). This paper introduces the formal ontological categories for clarifying the conditions of objectivity in evaluating validity claims in different ontological "worlds"—objective, subjective, and normative (Habermas, 1984, 1987; see also Carspecken, 1996)—in qualitative, quantitative, and mixed methods research and for understanding ontological types of information in library and information science research.

Objectivism and Relativism

It is commonly understood that validity in scientific research depends upon criteria such as generalizability and predictability. These evaluative criteria are based on the assumptions that collection of data, method of analyses, and research findings are "objective." The rationale of the evaluative criteria is straightforward: if the findings of a research study are not objective, how can we trust that the results are telling us the truth? If a study is not telling us the truth, it is useless, in the sense that it can neither be seen as evidence of current state of affairs, nor as a basis for further research, but perhaps a unreflective description or an analysis based on subjective interpretations.

Quantitative research is often considered as "scientific" (Johnson, Onwuegbuzie & Turner, 2007; Kvale, 1995) in the sense that such research (a) are based on observable facts (or data) and (b) are rid of subjectivity, and that (c) statistical methods and measures are rigorous because they do not depend on human interpretation. As a result, some prefer quantitative research because of their beliefs in universal truth in observable phenomena. In contrast, qualitative research is often considered as "subjective" or "non-scientific" because such research often appears as the product of the researchers' interpretation and/or as records of sentimental expressions of the peoples studied. Moreover, some argue that the findings of qualitative research is necessarily relativistic because there can be no objectivity in the study of human behavior and social action.

It is of little surprise that quantitative research is often discussed in relation to objectivism and qualitative research is discussed in relation to relativism. Bernstein

(1983) describes the views that objectivism is "the basic conviction that there is or must be some permanent, ahistorical matrix or framework to which we can ultimately appeal in determining the nature of rationality, knowledge, truth, reality, goodness, or rightness" and relativism is the belief that "concepts must be understood as relative to a specific conceptual scheme, theoretical framework, paradigm, form of life, society, or culture" (p. 8). While objectivists believe that there is universal truth independent of human perception, relativists proclaims that universal truth is impossible in all matters.

However, it is very dangerous to assume or conclude that qualitative research is ultimately subjective. In the social world, what appear as facts may implicate persuasion, while a narration may unfold reality. It is generally agreed that language use (for example, application of index terms in information seeking) and human desires and intentions (for example, "information behavior") are not best understood by quantitative research (see, for example, Blair, 2003; Fidel, 1993).

Unlike the studies of natural objects, understanding of social phenomena begins with a preunderstanding or prejudgment of human feelings, desires, and intentions. Arbitrary taxonomies (for example, "codebook" in qualitative research) and other forms of shared understanding are necessary in human communication. Without taking into account preunderstanding as a priori horizons for scientific understanding, there can be little basis for either quantitative or qualitative research or other claims of truth in the study of human behavior and social action. Social objects are meaningful objects, a priori to research, and so the self-understood and socially understood meaning have to be accounted for within a

hermeneutic circle of the researchers' own preunderstanding and their methods. "Method" for understanding meanings must include such self-interrogation into the research project for the purposes of establishing normative boundaries, commonalities, and differences. In short, as an epistemological principle, "method" cannot be reduced to techniques and technologies necessary to examine objects qua objects, but it must include an examination of the preunderstandings that are intrinsic to persons studying other persons, as individuals and as social groups. The lack of understanding this has led to a denigration of qualitative social science research in particular, and social science research more generally, as "relativistic," "subjectivistic," "non-scientific," "soft," etc. The issue of preunderstanding is intrinsic to each and every social science research project; it cannot be left behind in the establishment of natural laws. The research is upon "subjects" or persons, not upon natural bodies and their causal relations and expressions.

Further, we must also consider the fact that quantitative research is sometimes based upon (a) the researchers' choice of observable facts (or data), (b) facts (or data) that may include abstraction of desires, intentions, values, and beliefs, and (c) researchers' perception, interpretation and analyses of data (see, for example, Daston & Galison, 1992; Latour & Woolgar, 1986; Edwards, 2010; Edwards, et al., 2011). In other words, quantitative research may not be totally rid of human interpretation because data (or facts) collected may involve subjectivity expressed in abstraction (e.g., Likert Scale), not to mention that data could be "dubious" by the ways they are presented (Best, 2006). Statistical methods and quantitative research may not be as objective as they are often assumed to be.

On the other hand, it is also very dangerous to assume that all kinds of human conditions are "relativistic." Language use, for example, can be highly normative and its normativity is the social basis by which language works. This is not to deny the importance of culture, form of life, society, or theoretical framework in social research. In fact, they are the basic constituents of social action. However, if our understanding of meaning is altogether relative to our conceptual/theoretical framework, beliefs, and culture, what are the criteria or conditions for evaluating social research? After all, how can one justify that a report of information seeking behavior of tween boys is not a description based on unreflective interpretation of the researcher?

Measurement

Questions concerning the abstraction of subjective feelings, desires, and intentions do not prevail in the study of physical objects because we have assumed that physical objects such as rocks, trees, atoms, and molecules do not have intentions, desires, or feelings. Thus, observation, measurement, and experiment have become the predominant ways for understanding physical objects. Standards of measurement are standardized according to the predominant law(s) of nature agreed upon at the time, what Kuhn (1996) describes as the practices of "normal science." The dimensions and causal relationships between physical objects are usually "understood" *after* observation and measurement. For example, Pluto had been categorized as a planet until the discovery of other dwarf planets within the Kuiper belt. The validity of theory, and sometimes, categorization, is often either

confirmed by observation (for example, the expansion of the universe) or evaluated by predictability (for example, the preciseness of the Global Positioning System based on the theory of general relativity).

Research measurements of human behavior and social action, however, do not deal with non-intentional phenomenon such as time, space, and mass. Rather, as Habermas (1988) suggests, they are constructed on a case-by-case basis because "there is no protosociology that would explicate a unified transcendental preunderstanding of its object domain in the manner of protophysics" and "[T]here is no language game in actual practice that corresponds to the abstract requirement to measure social facts and to which the expressions of sociological theories could refer" (p. 98). Variables selected for representing human behavior or social conditions are thus arbitrary in the sense that they are based on the researcher's choice of variables, determined by his or her preunderstanding, or prejudgment, of the social situation in question. In other words, unlike physical objects, human behavior and social action are pre-understood *before* observation and measurement. In many cases, statistical analyses of human behavior and social conditions seek to confirm the researchers' preunderstanding of the research questions.

Nevertheless, the very assumption that human behavior and social conditions can be studied is that there is a *shared* reality. For if there is not a shared reality, most of our utterances, writings, and actions would not make sense. When we see a man down on his knee in front of a woman, holding out a box, in a public place, most of us would assume that he is proposing to the woman—not begging for her

forgiveness, or offering a treat. The fact that we can have the same interpretation of an event means that we are referencing to a shared understanding of the social situation. The shared interpretation is thus objective and can be considered as "facts." More importantly, the existence of a shared reality does not depend merely on our sense perception since we often share our feelings, beliefs, and preferences via language and meaningful actions without referencing to physical objects.

We have yet known whether there is an objective reality. Some theoretical physicists have suggested that what we believe as "objective reality" may actually be a result of *our* observation, *our* consciousness (see Goswami, 2001; Rosenblum & Kuttner, 2006; von Baeyer, 2003). Nevertheless, communicative action is understandable to each other because we are referencing to a shared reality; and it is this shared reality we want to discover in research such that we can understand our physical environment, cultures, and peoples. But how do we justify the truthfulness of expressions of feelings, desires, intentions, and norms? In other words, what are the conditions for evaluating studies of human behavior and social conditions in either qualitative or quantitative—and mixed methods research? If measurements are not best for understanding feelings, desires, intentions, and norms, we will have to explore how these expressions are justified and shared in human communication. Habermas' analysis of validity claims clarifies how expressions and norms can be explained and justified in social situations.

Communicative Action and Validity Claims

The physical sciences have successfully expanded our understanding of the physical environment with observations and experiments; as a consequence, objective evidence seems to have become the prima facie solution to scientific inquiry. "Is the question of reason still relevant in philosophy," Habermas asks? If we accept that there is not a place for reason in modern society, are we accepting also the positivist and empiricist assumptions suggested by the physical sciences can also be applied in sociological investigations? Habermas' theory of communicative action begins with an inquiry into the problematic of reason and suggests that the thinking of reason cannot be limited in philosophical discourse; rather, reason must be "tested" in the empirical world because formal structures of reasoning are relative, to a certain extent, to the time and space in which the actors live. Every communicative act, Habermas claims, can be explained and defended within a cultural milieu by a meaning structure that belies all types of communication. Habermas investigates the problematic of reason and rationality through the question: "How is mutual understanding (among speaking and acting subjects) possible in general?" (McCarthy, 1991).

For Habermas, symbolic meanings establish the "sameness" or identity, not via observations, but via conventional regulations. He explains that intersubjective validity and reciprocal criticism are inherent qualities of conventional regulations in maintaining the identity of meaning. Wittgenstein's discussion of rule is relevant here, Habermas quotes: "And to *think* one is obeying a rule is not to obey a rule. Hence it is not possible to obey a rule 'privately': otherwise thinking one was obeying a rule would be the same as obeying it" (quoted in Habermas, 1987, pp. 17-18). A rule cannot be private because it can only be the *same* rule when there are at least two subjects. The

sameness of meaning hence presupposes "both subjects must have a competence for rule-governed behavior as well as for critically judging such behavior. A single isolated subject, who in addition possessed only one of these competences, could no more form the concept of a rule than he could use symbols with identically the same meaning" (Habermas, 1987, p. 18).

The sameness of meaning is hence always criticizable because of the nature of intersubjectivity. That is to say, an actor can say "no" to a validity claim either because the claim does not follow the conventional rule or because she does not agree with the rule. Symbols become normed in the rule-following process. Habermas (1987) suggests that

> "Signal language develops into *grammatical speech* when the medium of reaching understanding detaches itself simultaneously from the symbolically structured selves of participants in interaction and from a society that has condensed into a normative reality" (p. 25, emphasis in original)

In other words, linguistic communication is possible only when the norms and rules are internalized in the cultural group. The internalization of norms and rules means that they are understood as what *should* be said or done under certain circumstances and conditions in a lifeworld—a "normative reality" where people interact with each other on a normative basis.

A normative reality does not entail all that exists is normed, however. Habermas is careful to point out that in linguistic communication an utterance or a sentence simultaneously relates to the subjective world of the other, to the objective world shared by all, and to the shared norms of the cultural group. As a result, a validity claim can be criticized in terms of its sincerity, its truth, and its legitimacy. Habermas argues that norm-regulated action, expressive self-presentations, and evaluative expressions, complementing constative speech acts, constitute "a communicative practice which, against the background of a lifeworld, is oriented to achieving, sustaining, and renewing consensus—and indeed a consensus that rests on *intersubjective recognition of criticizable validity claims*" (Habermas, 1984, p. 17, emphasis added).

For Habermas, reason is manifested in argumentation because "arguments are the means by which intersubjective recognition of a proponent's hypothetically raised validity claim can be brought about and opinion thereby transformed into knowledge" (Habermas, 1984, p. 25). In responding to a critique of a validity claim, one must respond with reasons that might reference to the objective, the subjective, and/or the normative world(s); otherwise, the argument would not be considered "reasonable" or "rational."

Formal Ontological Categories

Carspecken (1996) elaborates the Habermas' analysis of validity claims in terms of three formal ontological categories:

- Objective realm: characterized by the principle of multiple access – "the" world
- Subjective realm: characterized by the principle of privileged access – "your," "her," "my" world
- Normative-evaluative realm: understandings of what is proper, right, good, or bad; "our" world

Let's explore the subjective, the normative, and the objective worlds with an example: A researcher presents a study of information seeking behavior of an academic library website. How do we determine the validity of this study in regard to (a) the number of participants of the research study, (b) the factors contributing to the use of the website, and (c) the information seeking behavior of the users?

The number of participants in the study can be verified by anyone who can access the data and who can count, under the condition that they share the same understanding of the number systems and the definition of "participant" in the study. The factors contributing to the use of the website, however, cannot be evaluated in the same manner because, unlike the number of participants, justifications of information seeking behavior and social situations are not subject to multiple access and evaluation from an outsider perspective; rather, analyses of human, culture, and social phenomena involve the understanding of language use and meaningful actions that requires an insider, participant view.

Notions of "objective world" are most easily verified according to a correspondence theory of truth because of the principle of multiple access. The

reference of the objective world, however, can be deceiving in the case of social research because logical statements do not by any means represent only "objective" reality or causal and universal relations.

The subjective world, on the other hand, is characterized by privileged access. It is thought that one's feelings, desires, and intentions can only be truly known by oneself. For example, if Brianna tells the researcher that she is feeling badly because the reference librarian had a discriminating attitude toward her, how can we justify that Brianna is really feeling badly? If I promise that I will confront hardship with calmness and persistence, how can one tell that I actually feel this way? If Katie tells the researcher that she likes ice cream whenever it rains, should she be believed?

Feelings, intentions, and desires are not "out there" for multiple access and measured like rocks and trees in the physical world or the number of citations in an article. In fact, feelings, intentions, and desires cannot be known or understood unless they are expressed in meaningful actions. Therefore, validity claims reference to the subjective world can only be *justified*—not proved—by the *consistency* of one's behavior: "The sincerity of expressions cannot be *grounded* but only *shown*; insincerity can be *revealed* by the lack of consistency between an utterance and the past or future actions internally connected with" (Habermas, 1984, p. 41, emphasis in original).

The third ontological category—the normative world—involves our understanding of what is proper, good, bad, right and wrong. The normative world is largely concerned with values, beliefs, practices, and other norms that guide and influence our behavior and action in the social world. In other words, they are not

likes or dislikes, but actions and expressions that are bounded by cultural forms, that is, what is generally accepted as proper, good, bad, right, and wrong. These norms are not necessarily ethical or moral judgments and may simply be conventional practices. Ethical/moral expressions with the verbs "should" and "ought" usually indicate extra-normative judgments that correspond to what are taken as norms of the social world, but these modifiers usually are not used or necessary unless there is confusion as to the proper norms of actions. Formal statements such as bills of rights, mission statements, code of ethics, and strategic plans also involve normative evaluations that vary in their content between being normative statements and ethical/moral commands. Therefore, in terms of the three analytical categories, the normative world is concerned with norms, values, beliefs, and practices that are acceptable in a social milieu, "our" world.

It is important to note that, however, our language and actions are often fused with objective, subjective, and normative-evaluative validity claims. Habermas (1987) notes,

> Communicative action relied on a cooperative process of interpretation in which participants relate simultaneously to something in the objective, the social, and the subjective worlds, even when they *thematically stress only one* of the three components in their utterances. Speaker and hearer use the reference system of the three worlds as an interpretive framework within which they work

> out their common situation definitions. (pp. 120-121, emphasis in original)

In sum, research claims that achieve universality, particularly through the mediation of relatively non-ambiguous shared grammars (for example, mathematics) take the name of "objective" studies and their research foci are taken, more or less, as objects and objective events. The study of physical bodies is historically privileged in such a research paradigm, but in the modern period this paradigm has been extended to all manners of objects, including those involving what in ordinary language we see as "subjects." Subjective intentions can only be inferred by assessing intentions in terms of behavior, but the rules for that behavior can often be understood by asking a person why they did something or by understanding the context in which they act and the social rules they are using. The social world is largely characterized by normative-evaluative criteria for expressive action, and they are to be justified by the understanding of meaningful expressions in cultural and social milieus. Sometimes these expressions are understood qualitatively, and sometimes quantitatively, but the quantitative expressions must be understood as having different epistemic grounds and values that involve physical bodies, because (a) humans have powers of choice that physical bodies do not have and (b) social science research demands a hermeneutics, on the one hand, and an operationalization, on the other, of persons and their actions that problematizes the "objectivity" of the persons and their behaviors being studied. Put simply, the nature of scientific claims changes in each of these domains. There is no

"standard" or paradigm for "science" or for truth claims that can hold absolutely across these domains, since there is no single epistemic and ontological ground across them.

Position-taking

When we are new to a culture, we may not immediately understand the meanings of communicative acts that shape and are shaped by the culture and language. Therefore, a researcher must attain an insider, participant view such that the researcher is able to act communicatively with the people he or she seeks to understand so as to explicate norms, beliefs, and values, including those that may have escaped the explicit awareness of the actors. The insider, participant view also helps evaluate the objective, the subjective, and the normative claims the cultural group is making or is being attributed upon in their utterances and actions. To attain an insider, participant view and an intersubjective understanding of the culture, the researcher must position-take (including the first-, second-, and third-person position) with the cultural group, for observing as an "outsider" or a "neutral researcher" (i.e., maintaining a third-person position without taking a first- or second-person positions) implicates a subject-object relationship with the cultural group (see Habermas, 1987, particularly his discussion of "dog fight"; Carspecken, 1996, 1999). Moreover, without engaging in the first- and second-person position, a third-person position does not allow the interpretive framework (that is, the pre-understanding or prejudgment) of the researcher to be altered.

By taking the first- and second-person positions, the researcher tries to understand the formal ontological categories and implicit meaning structures through which members of a cultural group reference their thoughts and actions and by which their thoughts and actions are understood and judged as meaningful acts. Further, such position-taking requires the researcher to alter his or her interpretive framework during the interactive process.

The researcher also maintains a third-person position in order to understand the functions of meaning structures, patterns of interaction, ideologies, and so on, in relation to the structure of social systems. The maintaining of the third-person position during the interpretive and reconstructive process, however, is an evolving process; it involves re-interpretation of typifications and stereotypes. In this process, the researcher engages in *reflection*: when the researcher first interacts with the members of the cultural group, he or she holds preunderstandings of the people and the culture, that is, the typifications held while taking the third-person position; these typifications are altered, however, as the researcher grasps the meaning structures by taking the second-person position and by reflecting upon the typifications held through interactions with the members of the cultural group. This process continues until the researcher is confident that he or she understands the typifications held by the community members in a way that the researcher can communicate with the members as a virtual participant.

Hence, a certain "objectivity" of the social world is achieved based upon an agreement as to the typifications presented, in particular, the "findings" have to be agreed upon by others, including those who are being studied and experts who are

familiar with the particular cultural group and social system. “Objectivity” here denotes agreement between the different positions (first-, second-, and third-person positions) of persons in regard to the research questions. This is always a product of communication and agreement; put another way, the “objectivity” is a function of understanding based on norm agreements. It is by its very nature provisional and intersubjective. Method, here, does not construct subjects into objects, but rather, respects subjects as norm constructing participants in the process of research itself. Thus method is itself subsumed within the re-search, that is, in the inversion of normative infrastructures, which the subjects of the study participate in along with the research.

As has been discussed, ontological difference between the foci of the physical and social sciences lead to epistemological and methodological differences in what constitutes scientific research among them. Ignoring such differences lead to flawed research. “Objectivity” in research into the physical and in the human, social, and cultural worlds cannot and should not mean the same thing. The introduction of formal ontological categories (“subjective,” “normative,” and “objective” worlds) for research is out of the acknowledgment that there are different ontological types that shape appropriate validity claims and methods for research into their nature. Although these ontological types can coexist in the same thing—for example, human beings are selves, (social) persons, and physical organisms—these categories are not generally reducible to one another.

Mixed Methods Research for Library and Information Science

Choice of research methods is not only contingent on the research questions raised, but also upon the ontology of the foci of study as well as the appropriate epistemology. This fact gives insight to the problem of information: the term "information" may refer to different ontological types and that may be dealt with by different epistemologies and methods. It is imperative to understand the ontological referent of the term "information" in order to determine the appropriate epistemology and method for the study. For example, understanding "information" as a characteristic of the universe has become noted in theoretical physics (Greene, 2011; Moyer, 2012; von Baeyer, 2003). If we consider "information" as social phenomena, however, methods that are best for explicating and explaining norms and practices should be in place. In fact, many have discussed the discursive nature of information in library and information science (see, for example, Hjørland, 2007; Ma, 2010) and have suggested alternative approaches for the study of information (see, for example, Budd, 2006; Frohmann, 1994). Last, if we consider "information" as purely subjective, then we may consider employing methods for explaining information according to personal psychology.

It may be useful to note that most "information behavior" research in library and information science would better be described as the norms and practices that shape patterns of information needs and information seeking activities because information behavior research does not seem to describe the behavior of individuals, but the norms and practices of cultural and social groups. As Savolainen (2007) notes, the concept of information behavior seems to "refer to the ways in which people 'deal with information'" (p. 126).

Even singular instances of linguistic grammars of information may include different ontological contexts. So, for example, if a person claims that he is greatly inspired by a book and recommends the purchase of the book for a public library, the statement describes the book as an objective entity, as a socially acceptable information source, and as an inspiration *simultaneously*.

"Information" is not objective, subjective, or normative "in itself" because the term plays different roles in relation to different ontological referents and so has different types of validity claims that are appropriate for different types of research. Rosenbaum (1993) conceptualizes "information use environment" based on the relationship between "structure and action" (see also Rosenbaum & Shachaf, 2010). Studies of information behaviors or information use environments involve the analysis of physical conditions, normative rules, and social resources, which produce and reproduce "information" in organizations and societies, though these factors are not equally determinate for any one act, they are only together codeterminate the act. Indeed, the study of information in library and information science has always been "social" in the sense that it is not mainly concerned with the physical characteristics of information, but how people, as Savolainen (2007) puts it, "deal with information," often with the goal of improving information services and/or information system design.

For reason of this codetermination, mixed methods research may be useful for analyzing various contexts for information activities. Habermas (1988) has explained the integration of analytic and hermeneutic procedures for the study of social action:

> It must *analyze* the objective conditions of the situation, including the available and potential technologies and the existing institutions and operative interests. It must also *interpret* these conditions within the framework of the traditionally determined self-understanding of social groups. Thus I see a connection between the problem of a rationally compelling translation of technological knowledge into practical consciousness and that of the methodological preconditions for the possibility of a social science that integrates analytic and hermeneutic procedures. (pp. 20-21, emphasis in original)

The integration of "analytic and hermeneutic procedures" hints to the integration of different methods for investigating the conditions for communicative action as well as structure of social systems that may be detached from day-to-day activities, including regulations and sanctions that are institutionalized such as juridical law and steering media such as money (Habermas, 1987). Since conditions such as money and power often escape the explicit awareness of actors and thus may not be explicated by hermeneutic or interpretivist methods alone, analytical methods such as statistical analyses of large-scale data may be demanded for generating a "big picture" of the phenomenon.

By analogy, the study of information behavior involves the investigation of information needs or wants and of activities of information seeking such that the norms and practices of such activities can be understood. At the same time, it is also

necessary to investigate the information policies and other institutional structures that may constrain or enable the production of norms and practices in information behavior. The concept of information seeking as that of "communication between an organized, socially sanctioned information providing system (human or computerized) operating in the public sphere and an end-user or patron" (Benoit, 2002) presents a critical perspective of information research that not only aims to improve information system design, but also rejects "researchers' and users' atomistic perspective of language in information seeking" for "locating resources based on a representation of physical information objects" (Benoit, 2002, p. 463). "System" and "user" do not exist exclusively; in fact, the usefulness of an information system depends upon the interactions between "system" and "user" in the same lifeworld where they produce and reproduce norms and rules (see also, Rosenbaum, 1993).

In sum, information and information-related phenomena may be viewed as ontological types and associated activities that exist in objective, subjective, and normative worlds. Most commonly, the term "information," however, refers to social types and activities, with corresponding normative-evaluative claims. Methods and views of method in regard to epistemological understandings of science as applied to such "information" types and activities should respect the common understanding of information as social types and activities in library and information science research, unless there is extremely good evidence to suggest that the term "information" in such a form should be applied for explanatory reasons to physical ontological types and activities, and granting that the term is

redefined in the beginning of all research and discussion of this type. Correspondingly, physical science epistemology cannot be simply assumed for personal and social activities. Analogical applications of physical epistemologies upon social and personal concepts of information need to be very explicit in pointing out the analogical characteristics of their expression and the epistemological, methodological, and research limits upon such analogies. Failure to follow these simple epistemic rules results in confusion within and between disciplines.

Conclusion

In the above, I have analyzed the relation of different ontological "worlds" to qualitative and quantitative methods, and I have examined the position of different ontological types—particularly those referred to by the term "information"—in those worlds and their necessary epistemological and methodological commitments. A thorough consideration of ontological types and their epistemological and methodological commitments is necessary for any practice or theory of methods and mixed methods.

An epistemological framework for mixed methods research is necessary for integrating qualitative and quantitative research. Bryman (2007) states that barriers to mixed methods research include researchers' perception of "different audiences" and their "methodological preferences" (p. 12), and "bringing ontological divides" (p. 16). The preference for either qualitative or quantitative research is based on the conception that different methodological approaches have to be based

on different ontological and epistemological assumptions (Greene, 2006; Johnson, Onwueghuzie & Turner, 2007). From a skewed viewpoint, qualitative research is seen as absolutely relativistic and quantitative research objectivistic. The three formal ontological categories in Habermas' theory of communicative action (Habermas, 1984, 1987; see also Carspecken, 1996) offer a more nuanced view, situating validity claims in objective, subjective, and normative worlds. Such an analysis helps us to understand validity and truth claims as they occur in these different ontological worlds. The formal ontological categories also clarify that mixed methods research is feasible within a communicative-pragmatic framework and that qualitative and quantitative research methods are not necessarily objectivistic or relativistic.

Large-scale data often tell us about the patterns and locations (maps) of social interactions but lack the details as to why and how events may have happened; narratives about peoples and cultures reveal the subtleties of cultural forms and social practices yet they cannot stand-alone in the larger social system. Mixed methods research that combines large-scale data analyses and detailed description of community practice may provide us with richer understanding of information and information-related phenomena.

References

Benoit, G. (2002). Toward a critical theoretic perspective in information systems. *The Library Quarterly*, *72*(4), 441-471.

Bernstein, R. J. (1983). *Beyond objectivism and relativism: Science, hermeneutics, and*

praxis. Philadelphia, PA: University of Pennsylvania Press.

Best, J. (2008). *Stat-Spotting: A field guide to identifying dubious data.* Berkeley: University of California Press.

Blair, D. C. (2003). Information retrieval and the philosophy of language. *Annual Review of Information Science and Technology*, *37*, 3-50.

Bryman, A. (2007). Barriers to integrating quantitative and qualitative research. *Journal of Mixed Methods Research*, *1*(1), 8-22.

Budd, J. M. (2006). Discourse analysis and the study of communication in LIS. *Library Trends, 55*(1), 65-82.

Carspecken, P. F. (1996). *Critical ethnography in education research: A theoretical and practical guide.* New York: Routledge.

Carspecken, P. F. (1999). *Four scenes for posing the question of meaning and other essays in critical philosophy and critical methodology.* New York: Peter Lang.

Connaway, L. S., & Powell, R. R. (2010). *Basic research methods for librarians.* Santa Barbara, CA: Libraries Unlimited.

Creswell, J. W., & Plano Clark, V. L. (2007). *Designing and conducting mixed methods research.* Thousand Oaks, CA: Sage.

Daston, L., & Galison, P. (1992). The image of objectivity. *Representations*, *40*, 81-128.

Davenport, E. (2010). Confessional methods and everyday life information seeking. *Annual Review of Information Science and Technology*, *44*, 533-562.

Edwards, P. N. (2010). *A vast machine: Computer models, climate data, and the politics of global warming.* Cambridge, MA: The MIT Press.

Edwards, P. N., Mayernik, M. S., Batcheller, A. L., Bowker, G. C., & Borgman, C. L. (2011). Science friction: Data, metadata, and collaboration. *Social Studies of Science*, *41*(5), 667-690.

Fidel, R. (1993). Qualitative methods in information retrieval research. *Library and Information Science Research*, *15*, 219-247.

Fidel, R. (2008). Are we there yet? Mixed methods research in library and information science. *Library & Information Science Research*, *30*, 265-272.

Frohmann, B. (1994). Discourse analysis as a research method in library and information science. *Library and Information Science Research, 16*, 119-138.

Giddens, A. (1984). *The constitution of society: Outline of the theory of structuration.* Berkeley, CA: University of California Press.

Goswami, A. (2001). *The physicists' view of nature, part 2: The quantum revolution.* New York: Kluwer Academic.

Greene, B. (2011). *The hidden reality: Parallel universes and the deep laws of the cosmos.* New York.

Greene, J. C. (2006). Toward a methodology of mixed methods social inquiry. *Research in the Schools*, *13*(1), 93-98.

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin, & Y. S. Lincoln (Eds.), *Handbook of qualitative research.* (pp. 105-17). Thousand Oaks, CA: Sage.

Habermas, J. (1984). *The theory of communicative action (vol. 1): Reason and the rationalization of society.* Boston: Beacon Press.

Habermas, J. (1987). *The theory of communicative action (vol. 2): Lifeworld and*

system: A critique of functionalist reason. Boston: Beacon Press.

Habermas, J. (1988). *On the logic of social sciences.* Cambridge, MA: The MIT Press.

Harrits, G. S. (2011). More than method?: A discussion of paradigm differences within mixed methods research. *Journal of Mixed Methods Research*, *5*(2), 150-166.

Hjørland, B. (2007). Information: Objective or subjective/situational?. *Journal of the American Society for Information Science and Technology*, *58*(10), 1448-1456.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, *33*(7), 14-26.

Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research*, *1*(2), 112-133.

Kuhn, T. S. (1996). *The structure of scientific revolutions.* Chicago: The University of Chicago Press.

Kvale, S. (1995). The social construction of validity. *Qualitative Inquiry*, *1*(1), 19-40.

Latour, B., & Woolgar, S. (1986). *Laboratory life: The construction of scientific facts.* Princeton, NJ: Princeton University Press.

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.* (pp. 97-128). Thousand Oaks, CA: Sage.

Ma, L. (2010). Information as discursive construct. *Proceedings of the American Society for Information Science and Technology Annual Meeting, Pittsburgh, PA, October 22-27, 2010*.

McCarthy, T. (1991). *Ideals and illusions: On reconstruction and deconstruction in contemporary critical theory.* Cambridge, MA: The MIT Press.

Modell, S. (2009). In defence of triangulation: A critical realist approach to mixed methods research in management accounting. *Management Accounting Research*, *20*(3), 208-221.

Morse, J. M. (2010). Simultaneous and sequential qualitative mixed method designs. *Qualitative Inquiry*, *16*(6), 483-491.

Moyer, M. (2012, February). Is space digital? *Scientific American*, 31-37.

Pickard, A. J. (2007). *Research methods in information.* London: Facet.

Rosenbaum, H. (1993). Information use environments and structuration: Towards an integration of Taylor and Giddens. *Proceedings of the ASIS Annual Meeting*, *30*, 235-245.

Rosenbaum, H., & Shachaf, P. (2010). A structuration approach to online communities of practice: The case of Q&A communities. *Journal of the American Society for Information Science and Technology*, *61*(9), 1933-1944.

Rosenblum, B., & Kuttner, F. (2006). *Quantum enigma: Physics encounters consciousness.* New York: Oxford University Press.

Savolainen, R. (2007). Information behavior and information practice: Reviewing the "umbrella concepts" of information-seeking studies. *Library Quarterly*, *77*(2), 109-132.

Shapin, S. (forthcoming). The sciences of subjectivity. *Social Studies of Science.*

Tashakkori, A., & Teddlie, C. (Eds.) (2010). *Sage handbook of mixed methods in social & behavioral research.* Thousand Oaks, CA: Sage.

von Baeyer, H. C. (2003). *Information: The new language of science.* Cambridge, MA: Harvard University Press.

Wildemuth, B. M. (2009). *Applications of social research methods to questions in information and library science.* Westport, CT: Libraries Unlimited.