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REFRAMING INTERPRETIVISM AND POSITIVISM AS UNDERSTANDING AND EXPLANATION: CONSEQUENCES FOR INFORMATION SYSTEMS RESEARCH

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Completed Research Paper

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Abstract

This research offers a new perspective by reframing the positivist-interpretive debate as a distinction between the functional outcomes of research: explanation *and* understanding. *Based on an older and well-established literature in philosophy, this distinction can reinvigorate important differences in research outcomes that have been lost.* Understanding *or "subjective meaning" is connected to the intentionality, thoughts, and motivations of the human subjects under study. From this perspective, understanding is the type of knowledge gained from determining the meanings, categories, and symbols humans attach to actions, knowledge, and systems. In contrast,* explanation *is achieved by subsuming individual instantiations of the phenomenon under broad general laws, or identifying causal mechanisms that support antecedent-consequent pairs. Researchers can proactively use the understanding-explanation distinction as a heuristic to create new lines of research questions based on what has not been explained or understood rather than on which ontology or methodology has not been used.*

Keywords: Philosophy of Science, positivism, interpretivism, explanation, understanding, phenomenology

Introduction

The positivist-interpretivist categorization of Information Systems (IS) research has become deeply embedded in the discourse on research methods. It is provided as a basic distinction in PhD research methods seminars, has been the subject of numerous articles and special issues of IS journals, and it is used to categorize research on ISWorld.org. Recent editorial comments suggest that the alleged differences in approach are so deeply ingrained that they "are taken for granted. They have become folklore" (Weber, 2004, p. iii).

Interpretive research and its closely related cousin, qualitative research, have achieved some degree of acceptance in the academic discipline of IS (Chen et al., 2004; Galliers, 2008). Accompanying the price of acceptance, however, has been some loss of clarity in what makes interpretive research different, special, and valuable when compared to positivist research. A result of this is the position, recently advanced, that positivist research and interpretive research are essentially the same (Weber, 2004). One may, of course, define them so that, in effect, they are the same. However, the original attraction of interpretive research for the positivist mainstream was the former's promise of insights not readily accessible to the latter. To restore and reinvigorate the original attraction of interpretivism, we provide a fresh perspective on what interpretivism offers and a meta-theoretical reframing of positivism and interpretivism as *explanation* and *understanding*, which philosophers have examined as *erklären* and *verstehen*.

Rather than examine IS phenomena directly, we examine aspects of IS research itself. Our examination of IS research will differentiate theories in the genre of *erklären* from those in the genre of *verstehen*, and show how the distinction between them, as well greater attention to *verstehen*, can benefit IS research. We agree that the current conceptualization of the positivist-interpretivist distinction is muddled at best and frequently misleading. A reflective researcher will recognize that each of the two research genres has strengths and weaknesses depending on what sort of knowledge we are trying to obtain about a phenomenon (Alvesson et al., 2000). Ideally researchers select ontological assumptions, epistemological approaches, and research methods that are suited to the phenomenon under investigation. But, as Weber states, "we also need to have a deep understanding of the different sorts of knowledge we can obtain using different research methods" (2004, p. xi). Part of the confusion over the positivist-interpretivist distinction stems from the emphasis placed on research methods as a means of classifying, designing, and evaluating research such that method and ontology act as surrogates for improved knowledge creation. Multi-method approaches (Mingers, 2001) and integration of positivism and interpretivism have been suggested as techniques that improve the knowledge of the field (Lee, 1991; Orlikowski et al., 1991). But classification or evaluation of research by ontological stance is largely a short-term gain for the researcher. We present an argument that increases the focus on the nature of the knowledge produced by research and lessens the focus on the classification of the research by the methods or the internals of the research process. If we want to understand how different research papers may complement and support each other and if we want to make sense of how a given research paper contributes to the field, we would then want to focus on what is delivered by the research (either to the field as a whole or to some future research project in particular). The distinction between explanation and understanding provides a way to make sense of these outcomes. Method and ontology act as retrospective hooks upon which critiques of individual papers can be hung, but they do not address the fundamental issues underlying evaluation of knowledge claims. By this we mean that describing a paper as positivist tells us nothing about the type of method used (e.g. qualitative methods can be used for positivist research) or the type of explanation provided by the research (Hovorka et al., 2008).

One source of ambiguity in the positivist-interpretivist distinction suggested by Weber (2004) is the questionable claims of differences in metatheoretical assumptions between the two approaches. He argues that there are few if any differences between the current conceptualizations of positivism and interpretivism (including those offered by Lee, 1991 and Orlikowski et al., 1991) and that "differences lie more in the choice of research methods rather than any substantive differences at a metatheoretical level" (2004, p. x).

An approach that may rectify this problem is to reframe our knowledge claims as the older and well-established distinction between *understanding* (verstehen) and *explanation* (erklären), as a means of critiquing and improving research above and beyond current approaches. If the positivist/interpretivist distinction has become muddled and the differences have been relegated to the scrapheap, we can turn to a longstanding metatheoretical distinction that enables valuable distinctions among knowledge claims to be identified. In literature tracing the history of

philosophical concepts, Johann G. Droysen (1858/68) is credited with making the distinction between "explanation," which he saw as the task of natural sciences, and "understanding," which he considered the task of the human sciences. This perspective is able to clarify differences that the current discourse fails to capture and can serve as a point of reflection and evaluation of the kinds of knowledge provided by the different research approaches. Understanding and explanation of phenomena are major functional objectives for both those who conduct research in IS and those who apply the research results. Although the application of the concept of scientific explanation in IS has been discussed (Hovorka et al., 2008), little research to date has examined how explanation and understanding can be foundational in theory development. The objective of this essay is to explicate a distinction between understanding and explanation for the purpose of clarifying and renewing the distinction between, and different benefits of, positivism and interpretivism. In addition we demonstrate how the linkage between explanation and understanding can be used in the process of creating and testing rigorous theory in Information Systems.

Reframing Interpretive Research

Although qualitative research is an umbrella term covering an array of techniques, in general these approaches trade "in linguistic symbols and, by so doing, attempt to reduce the distance between indicated and indicator, between theory and data, between context and action" (Maanen, 1979, p. 520). Research by Lee (2004) identifies a feature of interpretive research that distinguishes it from positivist research and generic forms of qualitative research: its recognition of the "subjective understanding," which consists of the meanings that "the observed human individuals [i.e., "subjects"] create and share, and that they attach to one another, to their organizational setting and to their history" (p. 8). "Being part and parcel of the real world that the social scientist encounters, these subjective meanings are objective reality. As such, they require data collection or observation by the social scientist no less than does any other aspect of objective reality" (p. 8). For a researcher to come to understand a human subject's understanding is no trivial task; it is tantamount to the researcher's interpreting what the world means to the human subjects – hence, it is called the "interpretive understanding" of the subjective understanding. It is this task that has largely eluded recognition for the key role it plays in any interpretive research.

In contrast positivism "refers to an observing researcher's formal propositions, which not only specify independent variables, dependent variables, and the relationships among them, but also must satisfy the rules of formal logic and the rules of empirical testing (which include the rules of experimental and quasi-experimental design)" (Lee, 1994, p. 147). Although positivist research can result in multiple types of explanation (Hovorka et al., 2008), the constructs and variables belong exclusively to the researcher, not to the observed human subjects.

Qualitative research does not prohibit the use of the logic of scientific empiricism, but "phenomenological analysis is more likely to be assumed since qualitative researchers tend to regard social phenomena as more particular and ambiguous than replicable and clearly defined" (Mannen, 1979, p. 520). But the distinction between qualitative research in general and interpretive research that, in particular, results in understanding requires additional clarification. Although approaches such as ethnography and hermeneutics may result in interpretive understanding, we look to phenomenology – in particular, what is called the "phenomenological reduction" or simply "bracketing" (Husserl, 1964; Introna et al., 2002) – to underscore and clarify the understanding-explanation distinction. Since our objective is to illuminate understanding, we will not commence with a discourse on phenomenology; we will instead begin with an example.

Consider the example of what many IS researchers have described as "resistance," as in resistance to MIS implementation (Markus, 1983). In Markus' study, the concept of resistance is the *explanandum* (that which is explained) and describes the subjects' behavior. Markus offers three theoretical lenses that provide different *explanans* (explanatory mechanisms) by which the behavior is entailed. In this way the research seeks to explain the subjects' behavior. But, for sake of argument, suppose we were to take the position that "resistance" is more so an attribution reflective of the body of theory in which a researcher has already immersed him/herself than a description of the factual situation in the observed human subject's world. In this light, we may entertain the possibility that "resistance," as in "resistance to technology," carries a negative connotation which it shares with its synonyms: confrontation, fight, battle, fighting, struggle, conflict, opposition, refusal to accept, refusal to go along with, defiance, and challenge.[1] A tenet of interpretive research, however, is never to accept, at least not initially, the

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[1] Source: Microsoft Word 2003 thesaurus.

appearance of any person's behavior as irrational, self-defeating, unethical, counter-productive, etc. (Kanter, 1977, p. 331); after all, either the person indeed sees him/herself as irrational, self-defeating, unethical, counter-productive, etc., or the researcher has not yet achieved an "understanding" of what the person's behavior means to the person him/herself. To achieve such an interpretation or interpretive understanding of the subject's lived experience, a researcher needs to strip away or reduce the meanings that she brings, subconsciously or not, to her observation of the phenomenon. In the phenomenological reduction, the initial appearance is said to be "bracketed," where phenomenology borrowed this term from the mathematical practice of enclosing, and momentarily setting aside, a portion of a mathematical equation or formula. In bracketing any apparently irrational behavior, the researcher would be, in a sense, purposely setting it aside for dedicated observation and scrutiny so as to unveil its essence, or at least what it means to the human subject engaging in it. In bracketing "resistance," a researcher could question it, reflect on it, and (for sake of argument) discern that the person engaging in it does not see himself as negatively and unconstructively confronting, fighting, battling, struggling, etc., but rather as nobly protecting his colleagues, not just acting on his own behalf, so that they may continue to get their work done not only for their own benefit, but for the benefit of the company they work for.

Making the phenomenological reduction necessary is the real-world, objective existence of the subjective understanding. Interpreting the subjective understanding of "natives" in a preliterate society is challenging; interpreting the subjective understanding of managers in organizations is even more challenging, largely because we researchers are members of the same culture as they are, which actually serves to camouflage, rather than to unveil, any differences between how the managers understand their own actions and how we, as outside researchers, understand them.

Recognition of the subjective understanding and the need to interpret it, therefore, is key to what qualifies as interpretive research. Simply being qualitative does not necessarily make a given research study interpretive (and, indeed, there exist qualitative studies that are positivist, including positivist case studies). In the phrase, "explanation and understanding," the latter word refers to the researcher's understanding of the observed subject's own understanding of his or her experience. The recognition of this fact – the fact that the subjective understanding is, in itself, an objectively existing entity that is part and parcel of the empirical phenomenon being studied by the outside researcher and therefore requires observation like any other aspect of the empirical phenomenon – is not made by the explanatory types found in the natural sciences or in those social sciences that emulate the natural sciences (Hovorka et al., 2008). The knowledge claims of studies resulting in explanation or in understanding are fundamentally distinct. Thus, differentiating explanation versus understanding becomes a valuable means of categorizing and comparing the types of knowledge in research outputs.

Usage of Understanding and Explanation in Research

The terms *understanding* and *explanation* are widely used in IS literature but are frequently used with indistinct and sometimes contradictory meanings, sometimes even within the same paper (Table 1). Despite the extensive philosophical discussion on understanding and explanation in the Philosophy of Science literature and the initial expositions such as the one by Lee (1994) and Hovorka (2004), there has been little discussion in IS of how the understanding-explanation distinction and relationship might be used for the betterment of IS research. Consequently the relationship between the two concepts is frequently unclear and inconsistent.

Table 1. Usage of Concepts of Explanation and Understanding in Research		
Basis of Knowledge	**Understanding**	**Explanation**
Variables; causal antecedents	"While existing studies have contributed to our *understanding* of gender and age influences independently, the present research illuminates the interplay of these two key demographic variables and adds richness to our current *understanding* of the phenomenon…" (Venkatesh et al., 2003, p. 469). "Future research should focus on integrating UTAUT [the Unified Theory of Acceptance and Use of Technology] with research that has identified causal antecedents of the constructs used within the model … in order to provide a greater *understanding* of how the cognitive phenomena that were the focus of this research are formed" (Venkatesh et al., 2003, p. 470).	"Structural equation model analyses indicate that metrics tested through each model provide a statistically significant *explanation* of the variation in the EC consumers' satisfaction and channel preference" (Devaraj, 2002, p. 316).
Interpretation	Interpretive methods of research in IS are "aimed at producing an *understanding* of the context of the information system, and the process whereby the information system influences and is influenced by the context" (Walsham, 1993 p. 4-5)	The article by Gopal and Prasad (2000) focuses "on the ways people make sense of their experiences of using these systems and argue that the symbolic aspects of GDSS use can *explain* the contradictory findings of prior research. The rich description and interpretation … are a wonderful complement to the many positivist studies of group support systems" (Markus et al., 2000, p. 474).
Theory	"This study utilized multiple theoretical perspectives to develop an inductive *understanding* of desktop videoconferencing use, bringing together constructs addressed in previous research and others that emerged from this study. None of the theoretical perspectives alone *explained* the findings for the three types of employees…" (Webster, 1998, p. 278).	"According to this model, researchers concern themselves with a theory to *explain* and predict a phenomenon, where their research activity generally consists of articulating or refining the theory so that it may more accurately explain and predict the phenomenon" (Lee, 2000, p. v)

Table 1 presents examples of the use of the terms explanation and understanding in relationship to the basis for the knowledge claim (e.g. variables, interpretation, theory). We argue that that the concepts of understanding and explanation have been used inconsistently, loosely, or even interchangeably across these examples, and that the relationship between the use of the term and the underlying claim to knowledge is inconsistent. In this line of argument, it is generally accepted that variable-based studies provide statistical-relevance explanation (Hovorka et al., 2008; Salmon, 1989b; Salmon et al., 1971) and therefore variables are one foundation upon which to base one type of explanation. But, in this line of argument, the top pair of quotations in Table 1 would illustrate inconsistent use of the terms in that Venkatesh et al. (2003) claim that variables and causal antecedents increase our understanding while a different researcher uses variables as the basis for an explanation of performance differences between groups in an experiment (Devaraj et al., 2002). The second pair of quotations in Table 1 would illustrate how, for Walsham (1995), interpretation leads to understanding, whereas in Gopal and Prasad's (2000) research, the interpretation of symbolic aspects of the artifact is thought to provide explanation of contradictory outcomes. In the final example, theoretical perspectives are the basis for both explanation and understanding (Webster, 1998) and for

explanation and prediction (Lee, 2000). Of course, none of these authors may be credited or criticized for having, in the past, used or not used the terms "explanation" and "understanding" in the ways that, only now, this essay is propounding.

These varying uses of the terms nonetheless suggest a variety of interesting questions. Is providing *understanding* of a phenomenon and providing an *explanation* of a phenomenon the same kind of knowledge claim? Are explanation and understanding both based on causal relationships or antecedent-consequent probabilities between a set of independent and dependant variables? Does explanation *precede* and *lead to* understanding? Is explanation subsumed under understanding (or *vice versa*)? If these two terms have been used interchangeably because no difference between them has been perceived, then might not their underlying philosophical meanings be restored for the possible value they would have for IS researchers? These questions underscore our argument that clarification of the content and meaning of understanding and explanation will aid researchers in consistently and accurately describing the outcomes of research and guiding researchers in framing research questions. Examining the natures of understanding and explanation provides researchers an additional heuristic tool to critique whether data and method support the knowledge claims of the research. In addition such an examination may provide guidance for framing research questions around the type of knowledge claim that is desired.

Understanding and Explanation

A brief overview of the development and history of the terminology is warranted. First, we discuss the origins and form of the concept of understanding and its relationship to explanation. We differentiate our use of scientific understanding from the general notion of understanding as it relates to a state of mind achieved by observation of a phenomenon or the state of mind resulting from receiving or creating an explanation of a phenomenon (ie. "I understand that the apple fell because of gravity"). This common-use sense of understanding applies whether the phenomenon is social or physical. That is, we can speak of "understanding" the behavior of waves crashing on a shore even though the phenomenon in question is moving water, not some human subject of our observations. But we look to the distinction between the *scientific* concepts of understanding and explanation (Apel, 1984; Dilthey, 1989; Droysen, 1858/68; von Wright, 1971) and note that, although the nature of scientific knowledge has been argued for decades, the distinction is often lost in common usage where the terms are treated as synonymous and interchangeable. By tracing the origins of the concepts we can establish the rationale for restoring the distinction between understanding and explanation.

Understanding

Dilthey (1989) was instrumental in developing the explanation/understanding distinction by defining understanding as "the process by which mental life comes to be known through an expression of it given to the senses" (p. 332). From this perspective one "understands the aims and purposes of an agent, the meaning of a sign or symbol and the significance of a social institution or religious rite" (von Wright, 1971, p. 6). Understanding is connected to the intentionality, thoughts, and motivations of the human subjects under study. It has also been called the "subjective understanding" or the "subjective meaning" insofar as it is the understanding or meaning that the human subjects, in the phenomenon being studied, themselves have of the world around them (Lee, 1991). The emphasis is on dynamic choices, selective adaptation, and the range of possible functional outcomes in human-information technology interactions rather than linear cause-effect chains. Furthermore, the researcher seeks to develop his or her own understanding of the subjective understanding.

Hermeneutic and historical investigations are typical examples of domains in which understanding, rather than explanation, is considered the goal (Alvesson et al., 2000). The position that beliefs, norms, roles, and institutions inherently have or are tied to subjective meaning (the meaning held by human subjects) is well supported in philosophy (Dilthey, 1989; Winch, 1990) and in the IS literature (Klein et al., 1999; Lee, 1991; Markus et al., 1999; Orlikowski et al., 1991; Walsham, 1995).

But in Weber's (2004) presentation of Jorgen Sandberg's comparison of positivist and interpretivist metaphysical assumptions, Sandberg suggests that in interpretivism, the "researcher and reality are inseparable," "the research object is interpreted in light of the (researcher's) lived experience," and "researchers recognize and address the implications of their subjectivity" (p. iv). These statements reflect commonly held beliefs regarding the nature of interpretive research. But they privilege the *researcher's* interpretation of the subject as paramount rather than the

experience of the observed subject. This contributes to a confounding of the distinction between the researchers' frame of reference and the subjects' own lived experience.

Interpretive research is based, in part, on the idea that "because social theories are theories of intentional objects, they pose problems for analysis which cannot be grasped merely from an understanding of theories of physical things" (Fay et al., 1996, p. 29). We suggest that for a researcher to produce an understanding of observed human subjects' lived experience, the researcher should adopt a phenomenological stance to "understand participants' perspectives and views of social realities" (Introna et al., 2002, p. 57). Phenomenology was identified early in the history of IS as a means of determining "the structures of meaning that give sense and significance to our immediate experience" (Boland, 1984, p. 194) and has been used in recent IS research (Introna et al., 2002; Monod et al., 2005) and human computer interaction research (Svanaes, 2001). By utilizing the "phenomenological reduction" to "bracket out" the researcher's own theoretical attitudes and by "supposing that something has to be 'real' or 'concretely existing' to be experienced" (Husserl, 1964, p. 154), the researcher can come to *understand* the nexus of relationships that comprise the essential, subjective meanings held by the humans in the phenomenon that he or she is researching.

Humans perform voluntary actions stemming from human intention, whereas the causal or probabilistic antecedents identified by explanations do not have volition. Interpretation is required to connect to the actor's purpose, intention, motives and goals within the context of the phenomenon. This interpretive perspective assumes "that people create and associate their own subjective and inter-subjective meaning as they interact with the world" (Orlikowski et al., 1991, p. 5). These interactions are not accurately or appropriately described by the concept of causes in the natural science model, but must be understood as a constellation of beliefs, intentions and reasons that objectively exist as the subjective meanings held by the humans being observed, and that can be made coherent in terms of the whole (Fay et al., 1996). This focus on the whole was noted by Gadamer:

> *…thus the movement of understanding is constantly from the whole to the part and back to the whole. Our task is to extend in concentric circles the unity of the understood meaning. The harmony of all the details with the whole is the criterion of correct understanding (1976, p. 117).*

From this perspective, language-oriented phenomena such as thoughts, beliefs, and motives are objectively existing entities in the civilization, society, organization, or group being studied, but do not have the causal overtones or antecedent-consequent relationships that characterize explanation. Support for this position comes from Searle (2001) who argues that there must be a causal gap between the reasons for an action and the action itself. Individuals who perform conscious voluntary actions have a sense of alternative possibilities including the option of not performing the action. Therefore, the reasons for our intentional actions (as opposed to reflexes or powerful emotions) are not sufficient causal explanations in that they do not show that what happened, had to happen (Searle, 2001).

Salmon (1998) describes the distinction between three major foci of understanding. First is understanding based upon empathy or the sharing of feeling or emotions. Examples in IS include empathy (Agarwal et al., 2002) and flow (Jahng et al., 2000). A second type of understanding relates to the meanings of types of human expression in various contexts. These expressions include language, symbols, institutions, behaviors and meanings and are frequently the foci of studies in information systems research (e.g. Desanctis et al., 1994; Robey et al., 1996). A third type of understanding is based upon an appeal to the function or the intention of human behavior (for a review of intentionality, see von Wright, 1971). For example, a person's trip to the store to purchase aspirin is based upon his or her belief that aspirin is an effective medication for headache and that the store will be a good place to obtain it. It is the constellation of beliefs and desires in the context of the end goal that provides understanding of the behavior rather than the actual acquisition of the aspirin.

Examination of two contrasting examples illustrates how the conceptions of interpretivism and understanding can be better distinguished from each other. Returning to Markus' "Power, Politics and MIS Implementation," we note that three theories of resistance are compared to clarify explanations of "people's resistance to change in general, to technological change in particular, and most specifically to management information systems implementation efforts" (1983, p. 430). Although the study is qualitative in method, we may characterize it as a qualitative study but not necessarily as providing an interpretive understanding. We notice the researcher's *a priori* designation of peoples' behavior as resistance, whereas an interpretive understanding is not achieved *a priori* but instead would follow from an examination of what the local setting means for these people. One could argue that, by not explicitly addressing subjective intention, purpose, and meaning, but rather by presupposing categories already given by extant theory (e.g., "resistance"), the theories do not necessarily address people's behaviors for what their behaviors mean

to them during implementation. This qualitative view of behavior is consistent with the general approach in which humans are viewed as having properties and attributes and as providing certain responses to certain stimuli. Such a view does not (and, from its own ontological perspective, need not) take into account that some people may harbor subjective meanings of their actions as protecting or stabilizing the organization rather than as resisting change. A phenomenological interpretation could reveal these people as seeing themselves as constructively preserving (from their own viewpoint) the everyday procedures required for getting their work done so that their company may prosper. With this subjective understanding, they would be casting themselves as rescuers acting heroically, not as resisters acting destructively. We are hardly making the case that Markus sees people as destructive; rather, we have appropriated some material from her case study to fabricate an example to illustrate some of our points.

A second example is provided by "A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies," in which the authors suggest that "while existing studies have contributed to our *understanding* of gender and age influences independently, the present research illuminates the interplay of these two key demographic variables and adds richness to our current *understanding* of the phenomenon" (Venkatesh et al., 2003 p. 469). But by identifying causal antecedents of the constructs, the authors have provided a causal-mechanical explanation, not insight or understanding of the subjective understanding of the participants' own understanding of the influence of age and gender. The constructs and variables belong to the researchers and are not part of the subjects' experience and therefore cannot result in scientific understanding.

Explanation

The search for scientific knowledge can be traced back to early Greek philosophers who recognized a distinction between descriptive knowledge *that* something occurred and explanatory knowledge of *how* something occurred. From this has grown an extensive discussion of what constitutes a valid explanation (for a review see Salmon, 1989b). The two types of explanation that dominate explanatory research in IS (Hovorka et al., 2008) are deductive covering-law explanation (Hempel et al., 1948), and causal-mechanical explanation (Humphreys, 1989; Salmon, 1989b)

Causal-mechanical explanation, in which reality is explained as the "outcome of causally related, antecedent variables" (Boland, 1984, p.194), is fundamentally different from covering-law explanation, because we cannot logically deduce an outcome from a description of a cause, or logically deduce the cause from the nature of the outcome. Since this type of explanation is not based on formal logic, it cannot be determined *a priori,* and therefore it is produced empirically through experimentation and observation. Salmon (1998) suggests it is possible to work in either direction, from "relatively superficial causal mechanisms or particular facts… to ever more general types of mechanisms… to the most ubiquitous mechanisms that operate in the universe" (p.72) and to look "to the most general explanatory schemes we can find and work downward to characterize such items as laws and causal relations" (p. 72)

In the IS discipline, behavioral intention to adopt a new technology can be parsimoniously explained and predicted by the Technology Acceptance Model (Davis, 1989; Venkatesh et al., 2003). The difference between explanation and understanding becomes apparent when we note that the model treats human *intention* not as based on individual goals, subjective meaning, or history but instead as a caused, mechanical, and quantifiable construct. In contrast, a phenomenological *understanding* of intentional states would incorporate multiple facets of the context of use, individual history, and significance of the technology in identifying the necessary constellation of relations that provide meaning. The causal-mechanical model provides explanatory and predictive information but does not account for the complex referential whole and set of "possibilities for" that understanding provides. The concept of "possibilities for" encompasses the linkages that accompany use of a new technology (Introna et al., 2002). For example, to a potential adopter of a new information system, acceptance may change responsibilities, alter power relationships, require effort to learn, change communication patterns, and have other tangible and intangible effects. Understanding the user's "objective reality" expands the researcher's comprehension of the phenomenon of technology acceptance and creates the opportunity to develop and extend theory.

The Understanding-Explanation Relationship

If we accept the value of the distinction between understanding and explanation, it is worth examining the relationship between these research outputs. The understanding-explanation relationship is frequently proposed to be a directional one, where explanation leads to greater understanding of phenomenon in the world. For example:

> *Among philosophers of science and philosophical scientists…there seems to be a fair degree of consensus about the ability of science to furnish explanations, and therefore contribute to our understanding of the world. (Salmon, 1998, p. 76).*

The view that explanation precedes and creates understanding reflects a natural science model and is advocated by philosophers stressing methodological unity of the natural and social sciences (Binswanger, 1976; Hempel, 1996; Salmon, 1989a). A contrasting view proposes a difference between the natural sciences and the social or behavioral sciences (Apel, 1984; Gadamer, 1976; Scriven, 1994; Winch, 1990). Agazzi (1992) suggests that deductive logic is at the root of explanation and that interpretation is the fundamental intellectual procedure at the root of understanding:

> *…it is better not to contrast "explanation" and "understanding" but rather see them as distinct, but interconnected moments of the intellectual knowing activity (or of the process of reaching intelligibility) (p. 27).*

But it is evident in recent intensive social science that research produces both understanding and explanation, and that IS science accepts and requires a plurality of perspective (Hovorka et al., 2008; Watson, 1990). Explanation and understanding are not by necessity linked in the research process; rather each type of knowledge is produced as a result of different questions and can stand independently of each other. We may develop an explanation of deterministic/causal relationships between antecedents and outcomes alongside an understanding of the subjects' experience to build a pluralistic contribution to knowledge. But explanation and understanding may also be used in conjunction with each other as part of a constitutive process of knowledge discovery. Theory development and hypothesis testing frequently lead to identification of law-like relationships or causal-mechanical explanation. But rigorous hypothesis testing may also reveal inadequacies of the theory. At this juncture, an interpretive approach to the phenomenon can be used to gain understanding of the subjective meanings of the subject's own experience. In addition to providing intelligibility of a phenomenon, understanding, gained through adopting a phenomenological, ethnographic or hermeneutic perspective, can provide insights which reframe the phenomenon. This reframing may allow researchers to identify new variables and constructs for explanatory theory development. On the other hand, explanation is also not an endpoint for knowledge discovery as explanatory variables or processes may help researchers "bracket out" the preconceived ideas regarding causal effects, thereby allowing a stronger focus on the objective experience of the subjects. Thus the relationship between understanding and explanation represents a constitutive system of knowledge formation based on knowledge outputs.

Two examples demonstrate the relationship between explanation and understanding. First is the theorizing that has occurred in the stream of research on information richness theory (Daft et al., 1984; Hovorka et al., 2008). The traditional view explained media richness based on factors including immediacy of feedback, number of communication channels and cues, and language variety. The theory predicted that email is a lean communication medium based on these factors. But studies included empirical findings indicating that email supports a level of communication richness normally associated with rich media. By seeking understanding of the social relations of email users, Lee (1994) provides an example of how communication richness is an emergent property of the interaction of the electronic-mail medium with the organizational context rather than being explained by deterministic properties of the medium. By viewing email users as active producers of meaning rather than passive recipients of data, the researcher developed understandings of how constituents view electronic mail. In addition, examining the set of necessary social relations and interpreting the subjective meaning of the communication created an understanding of how communication richness can occur. A second example (Lee et al., forthcoming) involves the use of hermeneutic interpretation not to replace, but to reformulate, extend, and even strengthen a positivist explanation, which largely failed experimental testing in a study conducted by Dennis et al. (1998), about how individuals make decisions with a group support system. In this second study, Lee et al. offer an interpretive understanding of not only the preexisting social world of the human subjects who participated in Dennis et al.'s experiment, but also the research world of Dennis et al. themselves. Lee et al.'s (forthcoming) interpretive understanding identifies aspects of this particular social world that Dennis et al.'s (1998) positivist explanation – including its causal mechanisms linking antecedents to consequents – did not account for. The next step, whether for Dennis et al. or other positivist researchers, could be to explore improved causal mechanisms for a better predictive positivist explanation. If conceptualized in this manner, understanding and explanation, while distinct, but could be seen as orthogonal and complementary to each other (Lee, 1991).

Discussion

No discussion of philosophical differences in research approaches and outcomes can be expected to be the final word on complex philosophical issues. This research provides an overview of the major arguments regarding the distinction between explanation of causal-mechanical aspects and laws governing phenomena and the quite distinct understanding of a subject's "lifeworld" and the meanings that he or she attaches to behaviors, artifacts, and organizations. By presenting examples from the IS literature we demonstrate how the distinction between explanation and understanding can capture differences that are unclear in our discourse of positivist-interpretive methods.

The study of IS requires both an explanation component and an understanding component, and extant explanations and understandings serve as guides for research by identifying opportunities to replicate existing outcomes or to extend research by pursuing new explanations or understandings. By utilizing the differences between explanation and understanding, IS researchers can be better equipped to gauge the scope and limitations of research. Researchers will benefit from not only recognizing the differences between explanation and understanding, but also designing research to utilize the differences rather than simply pursuing ontological or methodological pluralism. Different types of explanation provide information addressing different questions about phenomena and lead in turn to new descriptive models and new questions. Understanding the multiple facets, history and biography of people as they appropriate and reinvent technology can help researchers to develop more rigorous theory.

This research makes four contributions to the IS research community:

First, by grounding IS research in concepts and terminology from the philosophy of science, this paper can better enable researchers to clearly and consistently describe the outputs of their research. They will also be better equipped to evaluate, critique, and extend research efforts by others. Researchers such as Abbott (2004) suggest a variety of heuristics for creating research questions, but do not include classification of research outcomes to determine parts of the whole that are absent. Classifying research outcomes in regard to explanation and understanding can provide a useful heuristic for framing research questions that address fine-grained causal mechanisms, more generalized law-like regularities, and understanding of human intentions, goals, meaning and adaptive behaviors.

Second, this research clarifies the long-held but often confused distinction between explanation and understanding. Research producing causal-mechanical explanation via variables or constructs, and research seeking to identify general laws provide valuable explanatory knowledge. Diverse phenomena are often caused by the same underlying mechanisms so that "to the extent that we find extremely pervasive basic mechanisms, we are also revealing the unifying principles of nature" (Salmon, 1998, p. 90). But in addition, we need to address other questions that do not evoke notions of causation or antecedents and that are tied to the subjects' own experience, perception, and attachment of meaning. These may include phenomena such as behavioral adaptation, socially constructed or cultural selection, and the variation among human-technology interactions. Understanding, gained through phenomenological reduction, provides a means of creating intelligible questions not amenable to traditional natural or positive science epistemology. Proactive use of the understanding-explanation distinction can aid researchers in recognizing the scope of current research and framing research questions for future work.

The importance of the explanation-understanding distinction is further reinforced when we consider the basis for IS theory. As discussed by Lee (2004), natural science and behavioral science theories are no different in their logical form. But the empirical basis of each is quite different. Schutz (1962) describes first-level constructs as the subjective understanding held by the subjects being observed, which provides the foundations for the interpretation or second-level constructs used in theory development (Lee, 2004). As material objects and processes do not have intentions or ascribe subjective meanings to other material objects and processes, there is no need for first-level constructs in theoretical causal-mechanical or law-like explanations. But human actors have intentions and the capacity to regulate their behavior rather than acting as passive agents in causal-mechanical systems (Bannon, 1991). Information systems lie at the intersection of the material and structure of the technology, and the social setting, human interpretation, and human intentionality in which the technology operates (Lee, 2001; Simon, 1969). Therefore understanding, which arises from first and second-level constructs, become a crucial part of social theory development.

Finally, this study suggests that by reframing the positivist-interpretive distinction in terms of explanation and understanding we can clarify the *goals of research* and, as Ron Weber suggest, "rethink and develop a new rhetoric so that we come to a deeper understanding of the metatheoretical assumptions that underlie our research" (2004 p.

xii). The IS community can benefit from recognizing the scope and meaning of research explanation and understanding and the implications for future research. By reflecting on and consciously recognizing the relationship between explanation and understanding, researchers can be better equipped to evaluate current research and to recognize future research opportunities.

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