Classifying Scholarly Theories and Methods

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ABSTRACT: This paper develops a simple yet powerful typology of scholarly theory, based on the 5W questions: "Who?", "What?", "Where?", "When?", and "Why?". It also develops a list of the twelve distinct methods used by scholars. These are then evaluated in terms of the 5W questions. Classifying theory types and methods allows scholars and students to better appreciate the advantages and disadvantages of different theory types and methods. Classifications of theory and method can and should be important components of a system for classifying scholarly documents. Researchers and students are presently limited in their ability to search by theory type or method. As a result, scholars often "re-invent" previous research of which they were unaware.

1. Introduction.

Classification is the essential first step in scholarship. Chemical reactions cannot be analysed unless one chemical element is first distinguished from another, atomic reactions cannot be comprehended without some sense of subatomic particles, nor can the characteristics associated with creativity be identified without some sense of personality dimensions. Classification of scholarship itself is likewise essential to its study.

Whether some types of scholarship are better than others, or whether different types of scholarship are best suited to different purposes, can hardly be asked in an intelligible fashion without first classifying types of scholarship. Less obviously, enquiries about the very possibility and limitations of scholarly enquiry would benefit from such a classification, just as the periodic table aids those who wonder what chemicals can do. A classification of scholarship should possess two qualities. First, it should identify an exhaustive set of types of scholarship. This would provide insight into the possibilities and limits of scholarship. Second, it should provide some theoretical order to the classification. This would aid efforts to identify the strengths and weaknesses of different types of scholarship. Both goals could potentially be achieved either with a unidimensional classification or with a multidimensional typology; both will be utilized below.

This paper argues that it is not only highly desirable but quite feasible to classify types of scholarship. In order to do so, the concept of scholarship must first be "unpacked" – to use a phrase favored by realist philosophers – into its constituent parts. The next section discusses the advantages for this enterprise of a simple yet powerful 5W typology, in which the "Who?", "What?", "Where?", "When?", and "Why?" questions are asked.[1] When these questions are applied to scholarship itself, phenomena/data, theory, method, and scholarly practice are identified as the key components of scholarship. This paper will focus on theory and method. These are, arguably, the two aspects of scholarship that are most in need of classification. The third section of the paper develops and applies a 5W typology of theory. The fourth section

provides a list of the twelve scholarly methods, and then discusses how the 5W questions help to identify the strengths and weaknesses of these. The fifth section discusses the practicality and advantages of using these classifications in systems of document classification. The sixth section provides concluding remarks.

2. A Simple Classificatory Guideline

At each stage of this investigation the five questions: "Who?", "What?", "Where?", "When?", and "Why?" can be asked. One desideratum of a classificatory system is that it helps users to remember diverse classes and where they fit. Since the 5W approach is familiar, this sort of typology is ideally suited to the recall function. It will be shown that this simple device is also well suited to guiding scholars to ask and answer interesting questions about scholarship.[2] The logical nature of a 5W typology protects against the danger of "reification", or creating false categories that come to be viewed as real. The 5W typology has the further advantage that five dimensions are quite manageable in scope.

In addition to the 5W questions, scholars often ask "How?" Philosophers, though, often distinguish scholarly approaches as to whether they are focussed on "Why?" or "How?". This suggests that "How?" is actually a combination of (some of) the other four Ws. It has been noted that when interviewers ask people a "How?" question, they are generally rewarded with a chronology of "When?" and "Where?" a process occurred (Goldenberg, 1992, 118). "How?" will thus be treated as a substitute for "When/Where" questions in what follows.

The analysis has proceeded so far by referring to the rather uncongenial formulation of "types of scholarship". Since scholarship is a complex process, it is hardly surprising that little analysis has been carried out at this level. If the 5W questions are asked of scholarly investigation in general, the classificatory enterprise can be broken into an exhaustive handful of key components. These in turn can be defined in more congenial terms.

Of any scholarly investigation, it can be asked, "What is the scholar(s) investigating?" Every investigation looks at something(s), be it chemicals or personality characteristics or art. These things can be called "phenomena". Ideally, then, an exhaustive list of the phenomena of interest to scholars (which should include all phenomena of interest to non-scholars), would be provided and placed within some orderly structure (see Szostak 2000, 2003). The correspondence between the phenomena that scholars aspire to study and the data that they actually encounter could also be investigated.

"Why is the scholar investigating that?" The answer, at least in principle, is that they hope to enhance their understanding (or perhaps "interpretation") of some aspect of the subject(s) being studied. Scholars organize their understanding in terms of theories. A particular investigation may be designed to derive, test, and/or apply theories, and these theories may involve the definition of particular phenomena or (more commonly) explication of links among these. This paper will identify the various types of theory that might be employed in scholarly investigation.

As noted above, a "How?" question can often substitute for "Where?" and "When?" questions. "How is the scholar conducting the investigation?" All scholars employ one or more of a fairly small set of methods. Since there are scarcely a dozen of these, an exhaustive and manageable list will be presented below. The strengths and weaknesses of each could then be investigated.

"Who is doing the investigation?" So far, the 5W questions have guided the classification of familiar elements of scholarly practice: phenomena, data, theories, and methods. The "Who?" question turns the focus on scholars themselves, and invites a classification of (critiques of) scientific practice (see Szostak, 2003b). This may unnerve those who cling to the ideal that scholarly research is an entirely objective pursuit. However, the past few decades have witnessed several attacks on this and related ideals. It is now widely appreciated that scholars deviate to varying degrees from a selfless and objective pursuit of understanding.

3. Classifying Types of Theory

With respect to both phenomena and methods, it is possible, at least in principle, to enumerate all phenomena of interest to, and methods used by, scholars. In the case of theory, new theories are invented every day, and thus an exhaustive enumeration is impossible. Moreover, casual inspection tells us that there are thousands upon thousands of theories used by scholars.[3] Nor is there one obvious single dimension along which these can be arrayed and then grouped into a manageable number of "theory types".[4] This being the case, development of a typology of theory will be particularly important.

3.1. Who?

All theories must deal with at least one phenomenon. Most generally theories deal with how one or more phenomena influence one or more others. Less commonly, scholars theorize about the nature or internally generated transformations in one phenomenon. In either case theories discuss how changes – perhaps just relative to some hypothesized alternative – in one (set of) phenomenon will affect either itself or other phenomena.

The "Who?" question can be restated as "Who is effecting change?" Any theory must grapple with "agency" at this level, for in specifying the initiating "change" which generates other changes, the instigator of change must be identified. If a theory addresses the effects of aggressive behavior it should specify whose behavior. Two important distinctions must be made here. The first involves whether the agent is capable of intentional behavior. ***Non-Intentional Agents*** provide most of the subject matter of the natural sciences. Atoms and chemicals and even tornados cannot have intentions. Biologists, at least, often investigate intentionality. Social scientists most often deal with ***intentional agents***, but far from always. Note in particular that institutions and organizations, though created through human intentionality, can then exert influences non-intentionally. Within both intentionality and non-intentionality, it is useful to distinguish different types of agent. The following three different types of agent are most readily comprehended with respect to intentional agency, but apply as well to non-intentional agency. Scholars, it should be noted, often argue that we should analyse only some of these. Those who emphasize individuals are often particularly hostile to discussions of group or institutional agency (and vice versa). The goal here, though, is to summarize all types of scholarly investigation:

Individual Agents. Theories may focus on a particular individual (say, the king) or, more commonly, on a "typical" individual. They may also explore how different types of individual will act differently in a particular situation. To understand why an individual behaved or believed as they did, scholars need to look within the individual. A range of theories that look at elements of the complex amalgam of genetic tendencies, abilities, personality dimensions and so on that comprise the individual are thus embraced here.

Newtonian mechanics provides an example of a non-intentional theory focused upon individual agency. Here the scholar analyses the behavior of individual particles or bodies that are presumed to act as a single unit.

Groups of Individuals: Talcott Parsons hypothesized four types of social group worthy of analysis (see Freidheim 1982). The "family" and "community" both operate, he argued, non-formally, and would thus be the sort of group that would be captured here. As Parsons recognized, in the study of an organization, which formally structures group processes, a mixture of non-intentional and intentional analysis might be necessary.

Statistical mechanics deals with distributions of velocities among groups of particles. The magnitudes that are important are group averages. Natural scientists have long distinguished these sorts of theories from the individual-agent analysis discussed above. A perennial question in physics is how these two types of theories might be tied together, and whether analysis at the group level reflects either a physical reality or ignorance about how individual particles interact.

Relationships. Some "interactionist" scholars argue that what happens between people is more important than what happens within them. Barnes (1995) speaks of individuals being "reconstituted" through their interaction with others. These scholars thus theorize about the effects that various types of human relationship have. While there are obvious overlaps with the study of groups, the focus is on personal interactions rather than group processes.

The analysis of fields in physics provides an example of the relational study of non-intentional agents. Fields mediate the interaction between the sources of the fields. Some scholars focus on the fields rather than the sources.

3.2. What?

"What do change agents do?" Non-intentional agents usually cannot actively "do" anything (tornados providing an obvious exception). They are thus restricted to a passive form of "action" wherein they provide *constraints* and/or *incentives*. These effects can be of huge importance despite their passive nature. Intentional individuals, relationships, and especially groups can also act passively. They also share with "natural" phenomena such as tornados the capacity to act actively: to *do* something in common parlance. In addition, they have the ability to do something that by their nature non-intentional agents cannot do: they can form beliefs or attitudes or intentions. That is, they can exert influence through thoughts as well as

deeds. These thoughts can be spoken of at the level of individuals and at the level of groups. Group attitudes embrace culture, public opinion, ideology, and nationalism. There are, in sum, three types of "What?" that map imperfectly onto the six types of "Who?".

A distinction might also be made between whether agents are "acting" or "reacting". However, the world is a complex web in which every phenomenon influences and is influenced by hundreds of others. Every "act", whether passive or active, action or attitude, is necessarily conditioned by the numerous influences upon the phenomenon in question. A scholar studying "reaction" is explicitly taking these into account. A scholar studying "action" is treating these as exogenous *for the moment* and focussing upon effects. An emphasis on "actions" is often associated with a "positivistic" approach to scholarship that seeks to analyse only that which we can observe, while an emphasis on "attitudes" is associated with an "interpretive" perspective that focuses upon how agents interpret their situations. Sadly, the critical role of passive "action" is ignored in this dichotomy, at least explicitly. As in almost every scholarly debate among opposites, there are legions of positivist scholars and philosophers who condemn the practice of interpretive scholarship, and legions of interpretivists who return the compliment. Again the goal here is to list all possibilities.[5]

3.3. Why?

"Why did the agent(s) act (react) as they did?" In the case of non-intentional agents, reference must be made to the constraints and incentives inherent in their nature. In the case of intentional agents the sort of "decision-making process" at work must be investigated. There are five main ways in which agents might make any decision:

Rational/Consequentialist. Agents focus on desirable consequences, and try to rationally calculate the best way to achieve those goals. These goals may be selfish or altruistic, and focussed on a diverse set of genetic drives or personal desires. They may reflect socio-cultural influences to varying degrees.

Intuitive. Agents act on what their "gut" tells them, without much conscious thought. Intuition may guide them toward satisfying various genetic drives. It may act upon various subconscious "schemas" about how the world works, the accuracy of which depends on one's lifetime experience, and particularly of traumatic events.

Traditional/Cultural. Agents are guided to do "what is done around here". This can at times occur intuitively, if they have internalized their group's attitudes and will feel guilt for breaking them. However, it generally has some conscious element.

Rules (Deontology). Agents follow a set of rules, which they have previously determined to be desirable. These may or not accord with cultural guidelines. Agents have devoted some thought to these (which in turn may be influenced by any of the five decision-making processes). Common examples are the Golden Rule, Kantian Imperative, or a belief in certain Rights. A host of more specific rules are also possible.

Process/Virtues. Agents are concerned more with how they act (the process) than what they achieve. They will generally evaluate their behaviour in terms of what are commonly called virtues: they may, for example, be determined to behave honestly at all times.

These approaches to decision-making can be combined. In judging what is "responsible" behavior, an agent may have recourse to cultural guidelines, evaluation of likely consequences, the Golden Rule, and gut feelings. *Theorists focussing on any one of them should be aware of (and ideally speak to) the possibility of other influences.*

The five types of decision-making capture a variety of distinctions made in the literature, such as conscious versus subconscious, and process versus outcome-oriented decisionmaking. Most importantly, they have room for both individual-level and societal-level influences. While each of the five types can be unpacked (with respect to particular goals, sources of intuition, rules, and virtues) each is nevertheless characterized by a well-defined decision rule.

When moving from individual to group or relationship agency an additional set of concerns must be addressed. Is decision-making democratic, or do some individuals exert disproportionate influence? Are there formal or informal guidelines for decision-making? Is decision-making consensual, or are there dissatisfied minorities?

3.4. Where?

"Where does whatever the agent does occur?" This question can be interpreted both literally and figuratively. Literally, it can be asked where in the real world "it" happens. There are two broad possibilities: that "it" can happen (almost) anywhere, or that "it" can only happen in certain specified situations. Figuratively, it can be asked which links among the phe-

nomena of interest to scholars the theory applies to. Again, a theory that speaks to a very small set of links can be distinguished from one that implies that the same effect is felt along a wide array of links. In both the literal and figurative cases, there is an important distinction between a search for "general regularities" and a search for "particularities". Philosophers have long used the words "nomothetic" and "idiographic" to refer to these two types of analysis. There has been a fair bit of confusion about what exactly these words mean, what it is that they refer to, and where the boundary between the two might lie. The analysis above provides concrete answers to the first two of these queries.

With respect to the third query, defining a boundary between nomothetic and idiographic theory is problematic. There is instead a continuum. In the literal case this runs from specifying no "external" conditions to specifying these in terms of all other phenomena. In the figurative case this runs from application to one set of phenomena to application to almost all sets. "Nomothetic" and "idiographic" can nevertheless be recognized as helpful classes. Theories of both sorts should struggle to be as explicit as possible about their range of applicability. Indeed, this is one of the primary goals of scholarship, and one area in which natural science excels over the social sciences and humanities.

3.5. When?

"When does 'it' happen?" Interpreted literally, this question can yield the same answer as the "where?" question, for it refers to the conjunction of realizations of other phenomena that must be in place for a given relationship to hold. Instead of looking at the timing of a process the "time path" of the process should be investigated. How, in other words, does the process in question work itself out through time? There are four possibilities:

- There are negative feedback effects such that the original impulse is exactly negated and the system of phenomena as a whole is unchanged.
- There is movement toward a new "equilibrium" where the system will only change in response to further "shocks".
- There are positive feedback effects such that certain phenomena continue to change in a particular direction.
- The effects are stochastic, and thus quite different outcomes are possible.

3.6. What Is A Theory?

The vexed question of defining the word "theory" has been avoided to this point. "Trying to give a basic comprehensive account of the concept of a 'theory' is an invigorating but fruitless walkabout in metaphysics" (Ziman, 2000, 117). Ziman asserts that scholars generally know a theory when they see one, and that theories are social institutions that conform to the standards of scholarly communities. By identifying above the dimensions along which theories can differ, a superior definition of the word "theory" can be provided. Theories, in other words, are specifications of agency, action, decision-making processes, location, and temporality, with respect to any (posited) relationship(s) among phenomena. Note that the focus here is on theories about how the world works; these can be distinguished from a range of philosophical theories about, say, how the world should work, or how scholars should operate.

Grand theories especially, but many narrower theories as well, combine different types of theoretical analyses of different phenomena. These might usefully be thought of as "theory clusters". Theory clusters should be evaluated theory by theory. The similarities and differences between theory clusters can then readily be appreciated at the level of individual theories. Those theories within a theory cluster that accord best with empirical reality, or involve arguments that are hard to examine empirically, can also be identified.

There is a long and troubled philosophical literature that attempts to differentiate science from nonscience, at least in the English-speaking world. Many scientists and philosophers clearly wish to distinguish what scientists or scholars do from what others do. The fact that the definition of a scholarly theory provided above excludes analyses that fail to engage the 5W questions – say, because they insist on some vague, undefinable, change agent – can thus be seen as a positive attribute of that definition. Note that the discussion of methods below will provide a further criterion by which to distinguish scholarly from nonscholarly analysis.

In Szostak (2003a) several natural and social scientific theories are placed within the typology. Several of these give ambiguous answers to some of the 5W questions. For example, debate rages among action theorists regarding answers to "Where?" and "When?" Notably, this debate can be more readily comprehended by stating it in 5W terminology. While greater clarity is desirable, the fact that individual scholars

within a theoretical camp can give precise answers to each question can cause these theories to be judged – perhaps charitably – as scholarly.

It might be argued that the 5W questions do not capture the essence of what a theory is, but merely certain, perhaps unimportant, attributes of theories. The logical structure of the 5W questions, and their successful application in the field of journalism, might be viewed as insufficient justification. When several social theories were placed within the typology in Szostak (2003a), the vast bulk of what commentators found it worthwhile to say about a particular theory was found to provide answers to the 5W questions (the rest dealt with personalities and philosophical perspectives). Most theories in natural science involve non-intentional agents, and passive reaction, and thus no active decision-making process. They can be distinguished in terms of individual versus group or relationship agency, where they occur (in both senses of where) and what sort of process is involved. It must seem, then, that the 5W questions do capture the essence of theories.

3.7. Advantages of A Typology of Theory

Turner (2000) identifies four major "problems" with social theory. The typology outlined above can provide a partial or complete solution to each of these. First, Turner worries that there is no obvious "progress" in theory. Theorists work on one problem for a while, and then abandon this to work on something else. Often they merely "reinvent the wheel", reproducing research on a problem abandoned long before. This typology, combined with the other classifications, provides a potential system of categorization such that a researcher could immediately know if a particular type of theory (and method) had ever been applied to a particular set of phenomena (see section 5). More generally, the typology provides an exhaustive set of "what is possible". This can alert researchers to possibilities that they may have overlooked. Most centrally it guides researchers to appreciate that they are striving for a mix of different types of theories. Necessarily each of these will have strengths and weaknesses. Rather than abandoning a research problem because of this realization, researchers are guided to work toward an ever-greater synthesis. From this perspective, the goal is to identify the range of applicability of all theories. That is, scholars should seek to answer "Where?" precisely. Finding limitations to a particular theory is thus "progress".

If it is accepted that scholarly theories should engage each of the 5W questions, and that the full set of possible answers to these questions has been identified, then the classification is necessarily exhaustive. Nor is this circular reasoning: it has been argued – albeit briefly – that scholarly theories should engage the 5W questions for purposes of scholarly clarity, not classificatory convenience. While considerable permutations of detail may be possible within theory types, there is a clear finite limit to the number of types. This, especially in concert with finite lists of methods and phenomena, means that scholarship is essentially bounded. There are limits to the directions in which investigation can be taken. A mistaken impression that the possibilities are boundless is likely one source of postmodern despair. A recognition of boundedness would then encourage a belief that enhanced understanding is possible.

Turner's second problem is that it is not clear whether the goal of theory is explanation (of actions) or interpretation (of attitudes). This paper has shown that the answer depends on the type of theory, and suggested that scholarly understanding requires both types.

Turner's third problem is that there is no consensus on what a theory is. Is a theory a broad framework for organizing research? Or a collection of general concepts which direct research? Or a specific orientation that guides researchers to ask particular questions? Theory can be all of these things, *but cannot be just any one of them*. Theory clusters, and perhaps some nomothetic theories, may serve as broad frameworks. Theory, though, must also fill in the details. Nomothetic theories can be thought of as general concepts (though the word "concept" is frighteningly vague), but research that was only guided by these would be severely limited. As for "specific orientation," theory can and should guide the formation of research questions. However it must in turn be *informed* by research, or scholarship can never progress. A definition of theory in terms of the 5W questions thus encompasses and surpasses the competing and incomplete definitions Turner reprises.

Turner's fourth problem is that social theory has not come to grips with various dichotomies, such as action versus praxis, agency versus structure, or individual versus societal causation. The typology developed here suggests that these are all legitimate types of theory. Scholars are guided to appreciate the strengths and weaknesses of each, rather than pretending that there is only one right way to proceed.

4. Classifying Methods

Scholars do not simply develop theories but also seek evidence with which to inform their theorizing. Scholarly methods are in practice as difficult to define in a sentence or two as are scholarly theories. In this case, though, the sort of definition proffered for scholarly theory above is even easier to derive, for there are only some dozen scholarly methods. Unfortunately works on method almost never juxtapose the methods of the humanities with those of other areas of scholarship. Nevertheless, by reading works on research methods and methodology across a range of disciplines, a list of scholarly methods can be developed inductively. Inevitably, it is possible that some methods will have been neglected, though this is only likely if these are employed by very few scholars. Methods that deserve separate treatment might also have been grouped together. Nevertheless, the primary result of such efforts – *that the number of distinct methods used by scholars is manageably small* – is robust, and would be upheld by further research along these lines. There are, broadly speaking, some twelve distinct methods employed by scholars (often in combination):

- experiments (including natural or quasi-experiments)
- surveys
- interviews
- mathematical models (and simulations)
- statistical analysis (often, but far from always, associated with models)
  - including secondary [that is, collected by others] data analysis
- ethnographic/ observational analysis [some would distinguish "interactional" analysis in which the investigator interacts with those under observation]
- experience/ intuition [some would treat this as an important subset of observational analysis, since we are in effect "observing" ourselves here]
- textual (content, discourse) analysis
- classification (including evolutionary analysis)
- mapmaking
- hermeneutics/ semiotics (the study of symbols and their meaning)
- physical traces (as in archaeology)
- some would treat "evaluation" of programs as distinct, though it can be seen as a combination of some of the above methods. Similar arguments can be made with respect to "demography", case study, feminism, and perhaps also hermeneutics. Certainly, "case studies" involve the use of one or more of the above methods.

This section thus starts with an *exhaustive* and *manageable* set of scholarly methods. It is therefore quite possible that both scholars and students could be acquainted with the basic pros and cons of every method, should this prove desirable. Moreover it will be possible to evaluate all methods in terms of the 5W questions.

Some scholars would attempt to aggregate some of these methods into broader categories. "Theoretical" methods, designed to look at the foundations of a theory, are sometimes distinguished from "Empirical" methods. Yet most methods can serve to establish both the general adequacy of a theory and the quantitative strength of posited relationships. Mathematical modelling is often viewed as theoretical, and statistical testing as empirical; note that the two are often used in combination. Some scholars would include the logical analysis of theory structure as a "theoretical" method; only methods that at least support the exposure of theories to evidence from the real world are included on the list above. "Quantitative" methods are sometimes distinguished from "qualitative" methods. In terms of the methods that were listed above, quantitative researchers favour experiments, surveys, statistical analysis of secondary data, content analysis, and structured observations (where particular "acts" are counted), while qualitative researchers favour participant observation, in-depth interviewing, case studies in general, biography, and focus groups (Oakley, 2000, 26). Yet exceptions abound in which advocates of one approach have nevertheless used the methods of the other. Goldenberg (1992, 322) thus asserts that (at least) experiments, interviews, and historical methods are not inherently quantitative or qualitative. Note that the boundaries are not always clear: when does an interview with a fixed set of questions cease being qualitative?

4.1. Strengths and Weaknesses of Methods

The scholarly community would want methods that could cope with each of the cells in the typology of theory. Obviously, there will not be distinct methods to place in each cell. Instead, every method should be investigated to ascertain how well it copes with the different types of agency, action, decision-making process, and time path enumerated in the typology of theory, as well as how generalizable it is. It might be

found that one method is clearly superior for a particular cell in the typology, all methods have some applicability, or a subset of methods is useful to differing degrees. Note that if different methods are best suited to investigating different theory types, multiple methods must be used in comparing one type of theory against another. If only one method is used, results will be biased.

In asking the 5W questions of method, additional dimensions along which methods can be evaluated emerge. It is noteworthy that the new dimensions refer to potential limitations of methods, rather than directly to the goals of methods. With respect to "who?", methods differ in terms of how many agents they can embrace. Surveys, for example, can deal with many more individuals than interviews, and these with more than participant observation (McNeill, 1990, 121-2). Ragin (2000) discusses the advantages and disadvantages of studying one versus many.

With respect to "what?", methods differ in how well they can identify a "causal" relationship. Note that the word "causal" is used here in the broadest sense. It is meant to include the transmission of attitudes or meaning within interpretivist scholarship. It is also meant to embrace complex systems in which diverse phenomena exert influences on each other. Regardless of what sort of process is investigated, there are four criteria for establishing a causal argument. The first involves showing correlation. Observations of the causal agent(s) should be associated with observations of the posited result(s). Second, the direction of effect should be established. The cause should appear *before* the results (as a general rule: there are some relations in physics where reverse temporal causation is posited). Third, alternative explanations of the observed correlation should be ruled out. Fourth, intermediate variables can be identified. These can aid understanding of why the causal relationship exists (Singleton and Strait, 1999).

Is "what is to be studied" dictated entirely by theory or not? A deductive approach looks only at phenomena and processes within a theory, attempting to ascertain how well the theory accords with reality. This can be distinguished from an inductive approach that embraces phenomena and processes that *should* be integrated into theory.

With respect to "where?" and "when?" it can be asked whether the method allows the observation of movements through space and/or time. As well, are scholars constrained to an artificial setting (like a laboratory) or can they observe agents in their natural setting?

4.2. Evaluating Particular Methods

"There is never a single way to conceptualize or address a problem. Nor is there any great consensus about how successfully various methods deal with particular issues" (Goldenberg, 1992, xiii). It is hoped that the questions outlined above will allow scholars to be much more definitive about the nature of a research "problem". The typologies can then provide a useful guide as to which methods are most appropriate.

Space prevents the evaluation of all of the dozen methods in terms of these various dimensions. This paper will treat experiments, interviews, mathematical modelling, participant observation (hereafter PO), and textual analysis in what follows. This allows coverage of methods commonly employed in the natural sciences, social sciences, and humanities.

Type of agents (and number investigated): Experiments can deal with non-intentional agents or individuals or relationships. Analysis of group behavior is generally though not always infeasible. Experiments usually deal with small numbers of agents, and thus questions of their representativeness can loom very large. "Natural" experiments, in which particular occurrences are analysed as they occur in the world, allow greater attention to group processes, as well as non-intentional agents such as planets or volcanoes, but at the cost of limiting the researcher's ability to control realizations of other variables.

Interviews are much more costly than surveys, and thus tend to involve limited numbers of individuals. Interviews can speak only indirectly to relationships (unless there are joint interviews) and group processes.

It is possible to model anything.

PO is focussed on intentional agents, but could comment on the constraints imposed by non-intentional agents. Only a small number of individuals or relationships, and generally only one group, can be studied at any time.

Texts speak most directly to the intentions of their author, but can also provide valuable insights into the author's perceptions of groups, relationships, and non-intentional agents. Love letters and other correspondence can provide special insight into relationships. Group-sponsored texts can speak to group attitudes. While the author in general cannot react to the particular researcher or research project, the author may nevertheless wish to leave a biased interpretation for posterity. There are limitations to the insights that can be drawn from any text, and also the number of texts that a research project can embrace;

texts cannot be fully appreciated, however, except in the context of other texts.

Type of causation: Experiments are very good at identifying both passive and active causation. They are less successful at measuring changes in attitude, for these must either be inferred from behavior or from interviews.

Interviews attempt to elicit attitudes. They might in this regard identify attitudes that encourage(d) particular actions. But people often do not know why they act as they do (Goldenberg, 1992, 352). Some interview questions can elicit insights into constraints/incentives imposed by impersonal agents.

It is possible, again, to model anything. The huge danger here is that, if the model is not going to be exposed to external reality it is difficult to judge its validity. Modelling can, though, aid researchers in identifying logical inconsistencies.

PO emphasizes attitudes, but could also study actions, as well as constraints/incentives. There may be no better way to ascertain how delinquents, for example, make sense of their lives. (Or not; one may always be an outsider, no matter how hard one tries.) The very presence of an observer – who will generally, though not always, let participants know who they are – might cause participants to behave differently, and pretend to different attitudes (see Goldenberg, 1992). However, if observed for a period of months, participants start to forget about the observer's presence, and would in any case find it difficult to pretend over such a long period of time. PO may also teach researchers about themselves.

Texts speak most directly to intentions, but provide indirect evidence on passive and active causation. In the case of historical events, texts (sometimes in conjunction with secondary data) may be the only information available regarding any type of causation. The researcher must be wary that the author has left a biased treatment of events. The availability of multiple texts (and multiple techniques for analysis) can provide some solace here, though note that most texts in world history have been written by well-educated, higher income white males. Those texts that survive are likely to have pleased the rich or powerful.

The four criteria for identifying a causal relationship: Experiments are very good with respect to all four of these, though there is some potential for bias in how competing hypotheses are tested. Note in this latter regard that experiments are potentially highly reliable, if not necessarily valid:[6] they can be easily repeated with all sorts of subtle changes to research design.

Interviews might establish a correlation between attitude pairs, or an attitude and action. They are limited in their ability to identify temporal priority (in part as interviewees may mislead on this and other points). The ability to distinguish among hypotheses and/or identify intermediate variables is limited and dependent on the researcher asking appropriate questions.

Models will "identify" what is put in them. They will ignore intermediate variables not recognized by the researcher, and provide no means on their own for dismissing alternatives that are not logically incoherent.

PO is potentially capable of identifying all four. Note, though, that PO researchers are often less concerned with identifying cause-effect relationships than to "tell it like it is" (McNeill, 64). Even many PO researchers feel the method is better for exploration than hypothesis testing, though others differ (Goldenberg, 1992, 322).

All four elements may be discerned within a text. While conclusions may be reached quite different from those of the author, researchers can only build upon the information the author (consciously or not) provided.

Decision-making processes?: Experiments are best at establishing links between cause and effect. They can illuminate some aspects of decision-making, such as the degree to which individuals are swayed by the views of others, but notably only to the degree that these aspects of decision-making can be operationalized in the experimental setting.

People find it easier to answer "how?" than "why?" questions in general. When interviewers ask why people did something, they tend to be given a chronological account. This often has little detail on how decisions were reached.

Decision-making processes may be modelled. It has proven much easier to model rational decision-making, which may induce a bias in theorizing.

Another strength of PO is that it follows subjects as they make decisions, and engages them in discussions about their thought processes.

Authors often provide some discussion of why they or others behaved as they did, though this may be ignorant or purposely biased.

Phenomena and processes outside of a particular theory?: Experiments are primarily a deductive tool: the subject is manipulated in a particular way and results measured. The experiment can only disclose the importance of phenomena unexpected by the researcher if some sort of mistake is made in experimental

design, either through the introduction of some unplanned element, or through failure to appreciate how the experimental environment would influence results. Such serendipity is surprisingly common in the history of science.

Some interviews are more "open" in allowing respondents to respond at length in ways not imagined by the researcher. These can elicit ideas outside of pre-existing theory. There is, though, a loss in objectivity relative to (survey-like) closed interviews.

Models by their nature include only those phenomena judged important by the researcher. In working out mathematical implications, the researcher will occasionally be surprised by a result.

PO is inherently inductive, though individual researchers may be guided to ignore evidence which conflicts with their desired conclusions. Note that a PO researcher can usually not take notes while observing, and thus there is a danger of selective memory. PO researchers may also come to identify with the point of view of their subjects, and ignore conflicting information. An opposite danger is that the researcher may be so overwhelmed by a wealth of "data" that they cannot establish causal connections; in practice this rarely seems to occur. Note that PO is a passive activity (demanding great patience); the researcher should not encourage actions or attitudes that they wish to observe.

Texts are usually quite "rich" and can thus provide a diversity of interpretations. As with PO, there is a danger of the researcher being so overwhelmed by detail that they cannot discern causal processes.

General rules versus idiographic relationships: Both are quite possible in experiments, for experimental design can be manipulated to see how a particular cause-effect relationship is affected by any number of circumstances. Experiments in human science are generally conducted by those confident of general patterns of cause and effect (McNeill, 1990, ch.3).

Interviews necessarily involve small groups of people, and thus general rules require integration of results across many studies. Interviews can, though, identify realizations of other phenomena that prevent a general rule from operating.

Modelling sets the stage for both.

PO is idiographic in focus, but studies across a variety of situations might identify general relationships. PO can, though, like interviews, usefully identify realizations of other phenomena that prevent a general rule from operating.

While individual texts tend to deal with the particular, general rules may be discerned by drawing upon many texts. Note, though, that there are many situations, historical and otherwise, for which no texts exist.

Spatiality (studies through space?): Experiments are usually constrained to operate in an artificial and small laboratory setting. There is thus a huge validity problem: do agents behave the same in their natural setting? This is usually not a great concern with non-intentional agents, but can loom large for intentional agents. Moreover, researchers cannot follow spatial behavior requiring more space than the laboratory. Even in natural settings, the mere knowledge that one is being observed can cause a change in behavior: the "Hawthorne effect" refers to studies in the 1930s that found by accident that workers increased effort whenever they were being observed.

Interviews occur at one or a few points in space. They must rely on the interviewee's memory and honesty (note that interviewees may mislead themselves as well as researchers) in constructing spatial processes. Models can have a spatial element, but because of the multiple dimensions involved this often makes the mathematics intractable. There is thus a bias toward ignoring spatial considerations. The PO researcher can potentially follow participants as they move through space. In practice, though, this may be constrained. One cannot follow firefighters or police or criminals everywhere. Research is conducted in a natural setting. Authors of texts may discuss movements of themselves and others through space, subject to the usual biases.

Change through time (continuous or static coverage?): Experiments are limited in their ability to analyse changes that occur over lengthy periods. "Natural" experiments are a bit different, allowing scientists some scope for analyzing revolutions or planetary formation. Interviews occur at one or a few points in time. They must rely on the interviewee's memory and honesty. Models can embrace change through time, but generally only smooth change through time (with the exception of chaos models). PO necessarily follows subjects over a period of time. The coverage is fairly continuous. PO studies generally last only a few months and thus cannot fully comprehend processes that evolve over longer time frames. Texts often provide continuous coverage over lengthy periods, subject to the usual biases.

Various time-paths: Experiments are best at identifying simple cause-effect relationships. They can identify equilibria in very simple systems (such as setting up a pricing game to see how a market-clearing price is established), but in general are poor at identi-

fying complex interactions. Interviews on their own would face great difficulty in identifying the nature of causal processes. It is easier to model equilibrium systems, and thus scholars must be wary of a modelling bias toward these. The PO researcher can identify movement toward either existing or new equilibria only if these occur within the timespan of the research. More generally, the researcher will identify some causal links that tend to maintain stability and others which imply change. It will be difficult within the confines of one study to identify the kind of change. Evidence of all sorts of time-paths can be gained from texts, subject to the usual biases.

4.3. Advantages of a 5W Analysis of Methods

It was noted in the previous section that the typology of theory provided an answer to the vexed question of "what is a theory?" Gower (1997, 249) bemoans the fact that the failure of philosophers to provide an "account of scientific method" to which no exception can be found, has, as with respect to theory, opened the door to those who would deny the very existence of "scientific method", or any standard by which this might be preferred to other forms of investigation. As with theory, the provision of a list of methods provides a more compelling definition of scholarly method than has existed heretofore. Moreover the 5W questions show that all of these methods can be evaluated in a similar fashion, and the important result derived that each has strengths and weaknesses.

There are, of course, other possible schemes by which one might compare and evaluate methods. This approach, though, has a claim to objectivity, and points to an exhaustive system of evaluation. Singleton and Strait (1999, 410) evaluate their four preferred methods in terms of seven criteria. Inevitably, they thus capture some but not all of the distinctions made above. They worry, for example, about the possibility of replication, the effects of researcher character and behaviour, and whether subjects react to being studied. Some of their criteria are quite general. For example, "limits to what can be studied" is suggestive, but nowhere near as concrete as the discussion above of how methods fare in terms of five distinct questions. Bouma and Atkinson (1995) evaluate methods in terms of five very broad questions: "What is happening?", "Has there been change over time?", "Are A and B different?", "Are A and B different over time?", and "Does A cause B?"; they conclude that one broad type of method is best suited to each type of answer. They thus severely underappreciate the rich variety of strengths and weaknesses in method.

One further advantage of the 5W approach is that it suggests that the scholarly community does not take full advantage of the potential of particular methods. These are often not used within their full range of applicability. For example, PO researchers could try harder to identify causal relationships.

The 5W approach provides a means by which both scholars and students could be introduced to the possibilities inherent in all methods. To master any of these methods is time-consuming, and it could hardly be expected that most scholars or students would be adept at more than a couple. Since people will be exposed in their lives to examples of each, however, they should be acquainted with the pros and cons, and potential biases, of each.

The single greatest advantage of the 5W approach is that it shows that there is a place for all of these methods in the scholarly enterprise as a whole. Each has unique strengths, but also unique limitations. The very fact that methods can be differentiated along several distinct dimensions cries out for the understanding that no one method should dominate the scholarly enterprise. What is true at the level of the scholarly enterprise as a whole is also true at the level of individual questions: these too tend to lend themselves to the use of multiple methods.

The 5W questions allow this argument to be fleshed out in detail. It can be asked whether there are particular types of agent, causal process, decision-making process, and so on for which one method far outperforms the others. The clearest positive answer to this question lies in the applicability of the experimental method to the study of the interactions among non-intentional agents. Here the limitations of the experimental method often do not come into play. It should hardly be a surprise, then, that, as Gower (1997, 10) notes, experiments are often treated as "the" method in natural science. Note, though, that experiments are still fallible. Researchers may be oblivious to the role played by various elements of experimental design in generating a particular result. Thus the results of experiments are "rarely decisive", and "often ambiguous and sometimes opaque" (Gower, 11). While those methods which involve asking questions of subjects are obviously unsuited to non-intentional agents, classification, intuition (chemical reactions are regularly observed in our daily lives), mathematical modelling (to identify possibilities and exclude impossibilities), physical traces (of interactions in a natural

setting), and even mapmaking (the Periodic Table can be seen as a map) can usefully be applied.

Other cases in which a particular method outshines others can be identified. Mapmaking can give unique insight into spatial and temporal aspects of a process. Intuition likely gives unique insight into how and why art moves us. Surveys are advantageous for gauging attitudes of large numbers of individuals. PO may be the only way to comprehend how others make meaning of their lives. But again all methods are problematic and scholars should wish to supplement these to the degree possible.

The social sciences and humanities are often viewed as weak relations to natural science, precisely because they are not dominated by a particular method. The 5W approach shows that the difference is one of degree rather than kind (albeit an important difference of degree). Not all natural scientists can avail themselves of the experimental method. Even those that can use experiments should nevertheless seek insights from other methods. Social scientists and humanists generally, but not always, focus upon intentional causation. They must then have recourse to a wider range of methods than those utilized in natural science. They should neither idealize nor condemn the methods of natural science, but draw from the full range of method (Bunge, 1998).

The 5W analysis can guide the research process in many ways. First, a theorist should be guided to specify answers to the 5W questions. They can then ask what sorts of method are best suited to each of the elements of a particular theory. While it may be impossible for an individual researcher to use all implicated methods, they might strive to use those underemployed by previous researchers. Note that for any non-trivial scientific question in social science it will be possible to identify some application of all methods. Scholars writing survey articles should thus strive to report research using all methods, or at least urge scholars to broaden their approach so that this can be done.

"Unfortunately, social researchers rely altogether too frequently on a single method or measure when a number of approaches could be brought to bear on the research question" (Singleton and Strait, 1999, 394). Where a particular research enterprise has been dominated by one method, the researcher can use the 5W questions to identify the most serious limitations of that method, and the relevance of these to the particular research questions being addressed. If, for example, statistical analysis of secondary data has dominated, scholars should be concerned about the possible exclusion of relationships from the analysis, the role of attitudes and decision-making processes, the possibility of exclusion of non-equilibrium processes, trivialization of the spatial dimension, omission of variables not implicated by theory (or for which data could not be found), and/or failure to properly identify causal relationships. Researchers could then turn to methods that are better in each of these respects.

5. Using These Classifications For Document Retrieval

Many studies have found that scholars seriously under-utilize subject catalogues and indexing and abstracting services. Weinberg (1988) attributes this unfortunate state of affairs to the fact that such classifications do not adequately detail what is novel about a work. They provide information of use to the novice concerning what a work is about but generally say little about the "ideas" contained in a work. Researchers thus rely on bibliographies and recommendations from other scholars, while recognizing that they thus likely miss important works relevant to their research interests. Weinberg (1988) recognizes that the theory employed in a work is a key bit of information rarely noted in subject catalogues. She also mentions method (as does Palmer, 1996), and cites favourably Swift *et al* (1978), who had argued for classifying works with respect to both theory and method. Yet Weinberg makes no recommendations for change, feeling that any effort to classify by theory and method would necessarily be too complicated.[7]

The classifications enumerated above could form part of a superior system of document classification. To be sure, documents should not be coded primarily in terms of the theories or methods used. Pride of place should be left to subject matter, so that documents on similar subjects would continue to be "shelved" together. Even here it would be beneficial to move away from the present discipline-based systems of classification toward a true subject-based classification, grounded in a hierarchical listing of natural and human phenomena.[8] "As research and knowledge become more interdisciplinary, the academic subjects represented in our research libraries become increasingly ill-suited to the conduct of research" (Palmer, 1996, 166). Such a list was derived (though further unpacking would be necessary) for the subject matter of the social sciences and humanities in Szostak (2000) and (2003).[9] This innovation would solve three broad types of problem experienced by existing systems: subjects that are studied by more than one discipline

receive multiple classifications, subjects that are inherently interdisciplinary have no obvious place, and subjects that combine existing subjects result in arbitrary classification decisions. Note that works discussing links between phenomena could be coded by linking the notations of these phenomena; enumerative schemes are often unnecessarily complicated because such linkages are given special entries.[10] Note also that the emergence of new areas of study poses no problem: these would be coded in terms of the phenomena studied.

After having classified subject matter, works can be coded in terms of theory and method. Of course, before librarians could code for these, authors would have to indicate which theory types and methods they used and which phenomena they analysed; this would be a useful exercise in clarification for authors. There being only twelve methods, it would be straightforward to provide each of these with a simple symbolic designation. Seeking to use the first letter of each method would aid both intelligibility and recall. Theory is trickier; while there are only a handful of possible answers to each of the 5W questions it would be desirable to code the answers to each question. This would require five notational places (four, if coding for generalizability were eschewed).

Coding for theory and method would be a major innovation. It would aid the task of simplifying the enumeration of subjects, for enumerative schemes often treat (some) theories and methods as "subjects". General works on a particular theory or method could be "shelved" in the most relevant category, or in a generalia class. Theories or methods applied to a particular subject matter would be shelved with that subject. Nevertheless, in the "subject" catalog, all works using a particular theory type or method could be easily identified. This is presently not feasible in almost any library. While classification codes are available for some methods, these are generally used to classify works about method rather than works applying a method. Moreover, methods – and even more so theory types – are not classified in an exhaustive and coherent manner in any existing document classification scheme. Researchers can be blissfully unaware of insights from the application of a particular method or theory type to other phenomena. The task of identifying the range of applicability of a particular theory is thus unnecessarily complicated. As well, scholarly efforts to comprehend the strengths and weaknesses of theories and methods are blunted.

"Progress [in scholarly understanding] depends on cumulative scholarship, which in turn depends on scholars' ability to access all that has been treated by the human intellect" (Svenonius, 2000, 29). At present, it can be difficult for a researcher to identify whether their proposed research has been performed previously. If, though, every scholarly work were coded in terms of every phenomenon or link between phenomena investigated, and the theories and methods employed, a researcher could simply inquire of the subject index whether a particular combination of phenomena, theory type, and method had been tried before.

Having identified subject matter, theory type, and method, works could then be coded as necessary for type of work (encyclopaedia etc.), language, time period, and geographical area in a manner similar to other classification schemes. Marcella and Newton (1994, 56-8) note the huge advantages of developing a common coding for such characteristics as time and place. The classifications suggested above extend these advantages into the realm of theory and method.

Some works are critiques of scholarly practice. These can also be coded in terms of a 5W typology of scholarly practice, where the "who?" question embraces concerns with the limited abilities and personalities of humans, the "what?" question asks "what is scholarship (science)?", the "where?" question invites analysis of the institutional structure in which scholarship is performed, the "why?" question involves study of the diverse incentives facing scholars, and the "when?" question embraces the place of a particular piece of research within the history of that field of inquiry.

Note that in classifying in turn by phenomenon, theory type, method, and scholarly critique, the 5W typology of section 2 has been utilized. The 5W approach has been used again in classifying theory and scholarly critique. The entire system of classification then hinges almost entirely on familiarity with the 5W approach, a list of phenomena, and a list of some dozen methods. Yet despite this simplicity it codes much more information than existing systems. Note also that this classification system, like all extant classification systems, combines elements of enumerative (the lists of phenomena and methods) and faceted (the 5W typologies) approaches.[11]

As noted in Szostak (2000) and (2003), philosophical concerns often exist on a plane "above" the phenomena investigated by scholars. It would undoubtedly be desirable to maintain a class for general works of philosophical interest. Still, philosophical evaluations of particular theories or methods are best placed with scientific analyses of these. More contro-

versially, philosophical (primarily ethical in this case) evaluations of particular phenomena might also be better placed with the relevant scientific material. As with critiques of scholarly practice, a notation that signified philosophical analysis would be desirable. Note that ethical "theories" can usefully be classified in terms of the five types of decision-making discussed above (Szostak, 2002). Subject searches of particular philosophical theories should nevertheless identify diverse applications.

Hunter (1988, ch. 8) identifies a handful of qualities to be sought in a classification system. The first is that each document should have a unique place. The second is simplicity. One beauty of the proposed system is that an overview can be provided in a handful of tables: of phenomena, methods, theory types, and so on. The organizing structure is transparent enough that any user should be able to "find" what to search for with ease. The third quality is brevity. Despite adding new elements (theory and method), the system of classification remains manageable. The proposed classification can also be described more easily than existing systems. The fourth quality is hospitality to new concepts. While this classification system is based on (hopefully) exhaustive classifications, they are nevertheless flexible and there would most likely be an obvious place for new elements to be introduced. An optional fifth quality is flexibility such that individual users can change the system to suit their purposes. The final quality is expressiveness, so that notation reflects the structure of the system. The logical structure of the notation, plus the possibility of often using the first letter of a phenomenon or method as notation, together suggest that this system could excel in terms of expressiveness.

Rowley (1992) describes two ratios by which the effectiveness of a "subject" index can be judged. The first, the recall ratio, compares the number of relevant documents retrieved relative to the number of relevant documents in the system. The second (and easier to measure), the precision ratio, compares the number of relevant documents retrieved to the total number of documents retrieved. By identifying all of the phenomena, links, methods, theories, and types of critique in a document, the proposed scheme should aid recall *enormously*.[12] Likewise, by avoiding *ad hocery* and a disciplinary basis, while aiding recall, it should greatly enhance precision. Rowley proceeds to considerations of time, cost, and ease of use. Again, by coding in terms of what people look for in a work, each should be greatly enhanced. Rowley closes by mentioning specificity, exhaustivity, and degree of error. By basing the system in hopefully exhaustive classifications, each of which has a specific place for each element, the system should excel in these respects as well.

6. Concluding Remarks.

The main arguments of the paper can be summarized here. A simple 5W approach to typology allows the four key components of scholarship to be derived and then classified. These are phenomena/data, theory, method, and scholarly practice. An exhaustive set of the possibilities of scholarly exploration can thus be identified. The 5W questions also guide a detailed appreciation of the strengths and weaknesses of different methods and types of theory. These classifications can and should form the basis of a superior system for classifying scholarly documents, which would allow searches by phenomenon, causal link, theory type, method, and type of scholarly critique. Scholars would thus cease re-inventing the wheel, while readily identifying novel lines of inquiry.

Notes

1. The 5W approach is commonly used in journalism to describe the key elements that a story should possess. Journalists stress "what" the most and "why" the least; in classifying scholarship no question can be ignored. See, for example, Hough (1985).
2. Bailey (1994, 12) discusses several advantages of a typology: to identify where a particular type falls along each dimension, to see which types are most similar and most different, to ensure that our classification is comprehensive, and to thus provide an inventory so that we "know at all times what types are available for analysis", and finally to provide insight into how the various dimensions are related if it turns out that many "cells" are empty. Scholars can thus aspire to answer a host of questions which are rarely even asked, such as: "Which methods are most similar?," and "What (types of) theory could we possibly apply to a particular issue?"
3. An attempt might be made to list those "grand" theories that aspire to cover links among most or all phenomena of interest to scientists. In the social sciences and humanities there are probably only about ten grand theories still embraced by a large number of scholars. Turner (2000) discusses most of these.

4. Scholars such as Wallace, Ritzer, and Freidheim have bemoaned the tendency to classify theories only in terms of their philosophical or sociological origins, rather than in terms of their internal properties. Moreover, when internal properties are discussed, there is disagreement as to whether this should be in terms of philosophical principles, some model of science, some view of the world, or the subject content of a theory (Freidheim, 1982, 4-7).
5. Potter (2000) and Bunge (1998) suggest that it is both practical and desirable to utilize both interpretivist and positivist approaches. Bunge also argues for the analysis of both individual and group or institutional agency. The interpretivist/positivist distinction is correlated with several other distinctions, including qualitative/quantitative, emphasis on intentional/non-intentional, constructivism/realism, and empasis on "what?" and "how?" versus "why?" In all cases, an argument that both types are needed is easily constructed. See Palys (1997), Tashakkori and Teddlie (1998), Seale (1999), and Oakley (2000).
6. Reliability concerns whether a particular result would likely be reproduced by similar research. Validity refers to whether research accurately reflects reality. While some interpretivists, especially those who doubt the existence of an objective reality, are suspicious of these criteria, interpretivist research is generally evaluated in terms of these (Oakley, 2000).
7. Weinberg notes that approaches to indexing have tended to become simpler as full-text searching has become possible. She notes, though, that full-text searching is often of limited utility in searching for theories, as theoretical ideas can often be paraphrased in numerous ways.
8. Scholars classify what they study, not what they produce. This last task is performed by bibliographers, whose duty is "to organize the knowledge produced by specialists so that it may be available for whosoever requires it", not to produce knowledge (Langridge, 1992, 18) . The system developed in this paper would provide bibliographers with a scientific basis from which to proceed.
9. Szostak (2003) developed a simple notational scheme whereby causal links are denoted by the first letter of the category name: $C \rightarrow S$ thus representing a link between some cultural phenomenon and some element of social structure. A more complex system would be needed for library classification, in which either letter or number codes were attached to second and third level phenomena: a particular occupation might be designated SO97, where O stands for occupation, and 97 represents the place of the particular occupation on some list of occupations. Note that notation serves to indicate where in the hierarchical structure of phenomena a work fits; Marcella and Newton (1994, 48-54) urge notations that reflect hierarchy. The task of further unpakking would be greatly facilitated by the fact that lengthy lists of such phenomena already exist within enumerative schemes. The schema would simply determine where such elements fit.
10. Marcella and Newton (1994, 60) applaud systems that allow "the expression of compound subjects via notational synthesis." Rowley (1992, 240) argues that "... any tool for the organization of knowledge must [among other things] take into account the relations between subjects."
11. Though it is not commonly recognized in the literature, Ranganathan's five types of facet accord with the 5W typology. His personality facet answers the "Who?" question, his "time period" and "place" facets engage "When?" and "Where?", his matter facet accords well with a simple "What?" question, and his energy facet, concerned as it is with the sort of process involved, reflects reasonably well a "Why?" question. It is noteworthy that the literature often presents Ranganathan's five facets with little justification. A system more firmly grounded in a 5W typology would be more easily justified. It would also be easier to recall and to utilize.
12. These classifications would, indeed, increase the likelihood that a researcher would be overwhelmed by the number of relevant documents identified. Ideally, they would thus both encourage and facilitate greater academic efforts to summarize research. See Willinsky (1999).

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