AN INTRODUCTION TO ARGUMENTATIVE INQUIRY

Mike Metcalfe[1]
University of South Australia
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One of the few long term outcomes that can be expected from a formal education in a rapidly changing discipline is knowing how to undertake inquiries in a professional and thorough manner. Designers of human systems who are without this skill are forced to repeat untested rhetoric. Ill formed opinions are presented as 'facts,' experience loses to rhetoric. Advice on how to design these complex systems will not be justified by wide and thoughtful inquiry. Careful inquirers soon learn that knowledge is determined by the context. This paper draws on the multiple perspectives theory of knowledge philosophy. It provides an introduction to how 'good' knowledge is created and tested in the sort of complex social situations typical of development of complex human systems such as organisations and communities.

The design and development of communications and human systems starts with the ‘analysis’ of such things as the participants requirements and seeking an improved appreciation of the problem situation. Different people call ‘analysis’ different things, examples include ‘research’, ‘study’ and ‘inquiry’. In philosophy, it comes under ‘the theory of knowledge’ but, whatever it is called, human system designers need to do it very professionally. The results will direct the expenditure of many thousands of dollars and determine the competitiveness of an organisation for many years to come. It is about knowing how to inquire; how to collect good knowledge and reject bad knowledge.

How is inquiry best done? How can you tell the difference between good and bad evidence (knowledge)? How can you ensure only good, useful, effective knowledge is created and used? What skills should a good inquirer have? Who has studied this problem? This paper will try to address some of these questions. However, it is based on the author’s belief that inquiry is best undertaken by assuming there are two distinct types of knowledge; objective (positive) and interpretive (subjective). The former is considered independent of any individual person’s opinion and is important to engineers. Examples include CPU speeds, processor size, and how many legs there on my coffee table. The second is very important to designers of human systems. It is considered very *dependent* on the personal experience and context of the interpreter. Examples include whether globalisation is good, the purpose of a socio-technical system and why my coffee table has four legs. Inquiry into objective knowledge involves collecting averages, majorities, identifying variables and undertaking measurements. Inquiry into the interpretive knowledge involves talking to people, exploring diverse views and revealing underlying tensions.

Seeking Interpretations

The inquiry strategy for the design of human systems (DHS) needs to concentrate on ‘interpretive’ knowledge. Rather than the sort of objective knowledge gathering strategies associated with the sciences such as physics and chemistry, DHS is more aligned with inquiry

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into history. This is because we are dealing with people working with “things”, rather than with the ‘things’ themselves (objects). This paper will assume that the inquiry methods associated with science are best applied to physical objects like computers, but the inquiry methods best suited to the study of people acknowledge that people can think for themselves, they can think about their own thinking, have useful insights due to their experiences and they can think differently in different contexts. In people inquiries, ***context*** is everything. For example, they may act differently the second time they do something compared to the first. They are emotional, they have to be to make sensible decisions. Inquiry into people’s activities, social inquiry, cannot draw on any universal laws of behavior, as may be reasonable with molecules. They cannot think, choose how to react, nor are capable of understanding better than the inquirer as to the political ramifications of any act of inquiry. Put crudely, if you heat a room full of molecules up three times they will do the same thing each time. If you heat up a room full of people three times then they may well become fed up, abuse the inquirers and leave.

Rather than compare inquiry into the design of human systems (DHS) with science, examining its differences with social research may be more constructive. Anthologists, psychologists as well as historians study the impact of technology on people. Historians have done a good job of explaining the huge impacts the deep plough and the clock had on the social and economic development of some nations. However, the design of human systems (DHS) is working to encourage, and be instrumental in, the very change that it is researching. This does have an impact on the selection of appropriate inquiry methods. For example, relevance becomes a priority over rigor. What is the use of providing rigorous research on old technologies? To do so would be an historical study not IS design inquiry. Attempting to isolate and measure causal variables prior to any design work is also questionable. Linguistic definition of variables (such as leadership, motivation, performance) and their circular interaction is too complex to capture using statistical tests. Most of these tests were designed by Fisher in the 1930’s to compare the growth rates of different plant species under repeated controlled experiments. They are inappropriate for complex social situations. The adoption and imaginative use of technology by designers requires some appreciation of their needs and wants. The act of appreciating stakeholders wants, the power they have to achieve those wants and accommodating them into the design of an IS system is the inquiry work required for most IS design projects.

Consider an illustrative example intended to bring out the difference of “interpretative inquiry” and how it extends the traditional scientific methods. I am looking at a small coffee table with four legs. That it has four legs, I feel, is without dispute (assuming we are agreed on what defines a “leg”). It is the truth (the “whole”), no matter who came into my room. If someone said it had three legs, I would say they were wrong. I consider it a “fact” because by far the vast majority of people would agree with me, wherever in the universe I placed the table. This knowledge can be considered for all practical purposes to be like an “object” (objective). The scientific inquiry methods would be appropriate here. We could measure and run controlled experiments to discover the truth about the number of legs.

However, if I asked “why” it has four legs, the problem domain changes considerably. Under the interpretive inquiry method, it would be inappropriate to seek “the truth about why it has four legs”. We may ask what the original designer’s interpretation was but this is not the only interpretation. Another person may argue that the designer was unaware of the influences acting on their thinking. An economist might interpret the number of legs as the optimum between cost and stability. An engineer may say it’s the most stable with clear access under the table, a historian might say it symbolizes the art of some past period, and an artist that it is looks like an antelope. There is no truth here, only interpretations (perspectives). System designers find this type of knowledge very useful because it opens up their thinking.

The interpretive or multiple perspectives approach that has been promoted in DHS by Churchman [1971], Mitroff [1972, 1993], Mason [1969], Checkland [2000], Avison and Wood Harper [1998] and Linstone [1984], suggests that it is the appropriate inquiry method for a designer. The aim being not to come to a consensus but rather to learn from the diversity of ideas, and then to be in a better position to design a more effective DHS. While each interpretation may not be directly applicable to specific situations, learning still occurs but more in the way we learn from the experiences of history. Further, as each interpretation needs to be fully explored and articulated, it would be useful if the interpreter were inquired upon by the normal means, that is, reasoned debate. These seminal authors in the design of human systems use the term from philosophy: dialectic argument.

Argumentation

The role, then, of the argumentative process is to encourage and explore alternative interpretations (perspectives). This combination provides a very useful inquiry methodology for DHS designers and maybe other forms of social inquiry. The rest of the paper will explore the implications and background assumptions of using this approach. First, some of the concepts involved in this approach need to be explained.

The argumentative process should not be confused with quarreling. The images conjured up by the words “debate” or “negotiation” may be more useful. By “argumentative” it is meant that a proponent takes a position and presents evidence to an audience in order to let them explore his/her interpretation. The audience is expected to take an active role creating the understanding by responding with counter arguments. By this dialectic, back and forth process, learning (knowledge creation) is expected to “unfold” [Urlick, 1980]. As will be discussed in more detail later, this approach to research requires some different thinking about how valid knowledge is created. For example, the assumption of the impartial researcher no longer exists – it is a bit of a myth anyway. The audience and means of communication becomes central. Also, presenting research as an argumentative *process* makes it clearer that research involves an ongoing dialogue. Further, it allows both the researchers and those being observed to learn from each other.

Knowledge as Relative

It seems hard to start collecting knowledge when you don’t have any clear idea what it looks like. Casual thought would suggest that anything that you saw, heard, thought or felt, which you had not before, could be called *new* knowledge. But it may be “inconsequential” knowledge. You know that my coffee table has 4 legs. But does it not feel like rather unsatisfactory knowledge? I suggest that is because it is not related to some concern you have. For example, if you had to catch a plane then the departure time would useful knowledge. While the number of table legs or the departure time is objective knowledge, it still only really counts as knowledge when it is related to a human concern. The argumentative method not only helps with exploring perspectives but also allows the opportunity to explore people’s concerns which, in turn, defines what is useful knowledge and what is not.

There is an added problem. It is not enough, especially in IS, that these concerns may be shared by others. Any knowledge relevant to people with the same concerns really needs to get out to them. Not only is there a communication problem but also a convincing problem. They may disagree with what you tell them, or even that they should be concerned. People need to be convinced that what you are sending is useful knowledge.

The argument approach is usually said to start with Socrates, Plato (*Republic iv*) and Aristotle (*Topics and Rhetoric*), coming from their search about how to educate knowledgeable politicians. They wanted to know how (useful) knowledge was both created and communicated to the community. Socrates seems to have started the method by which those who claimed to have some "knowledge" were tested by using what we now call the Socratic method. It involves a series of challenging questions, each dependent on the answer of the last, a dialectic, between someone who believes they held some knowledge and an antagonist (invariably himself). Which is why Socrates did not like books (*Phaedrus*). However his style got him tried and executed by his peers for corrupting the minds of the youth! A fate that anyone who plays the role of devil's advocate too often will understand very clearly. Plato conceded, writing up some of Socrates' sessions. There are many who agreed with Socrates: with the need to set up a dialectic, a debate, an argumentative process, starting from a proposition (claim, thesis) in order to test knowledge. This does not explain where knowledge comes from, merely how it should be tested. So, for example, I may put a stick in water and note it bends. If I say to myself, "This is because it gets wet," then I should take this claim to a room full of critics and subject myself to Socratic questioning.

Socrates and Plato seem to have also been concerned with the use of talking to test knowledge. While they believed in questioning, they were opposed to "mere rhetoric." While both forms of talk might persuade, they thought the purpose of "mere rhetoric" was not to test knowledge, rather to secure money or status. Aristotle (Rhetoric) moved this issue on by classifying types of talking (and writing). His work has been revisited by Walton [1998]. Basically, the range Aristotle suggested was from hard logic (e.g. all men are mortal, Socrates was a man, so Socrates was mortal), through courtroom style controlled debate, on to politician's chatter, and nearly off the useful scale at quarrels. Poetry, descriptive work, was treated separately. He thought it the highest form of language, but not about testing knowledge. In modern times, the last two hundred years, the first form held dominance, but in post modern times, this century, following the realistic study of how scientists actually work, the "courtroom" style has gained more acceptance as a valid means of inquiry into interpretation. Some, in increasing numbers, believe that poetry and stories can be used to test knowledge, but I'll leave them to defend their interpretation.

This still leaves us with the problem of where new knowledge comes from. Supporters of the only-objective knowledge (rationalists, positivists) perspective believe it needs to be independent of any one person's mind. Descartes, for example, said it must come from building on already established objective knowledge, through applying rigorous logic (pure reasoning) of the form:

Socrates is a man (known)
All men are Mortal (Known)
Therefore Socrates is mortal (new knowledge?)

This may well provide reliable, new knowledge but it proved to be a bit impractical. Partly because "what objective knowledge is known" often turned out to be wrong but also because the application of rigorous logic tended to be very laborious, made only very small advances in knowledge and discouraged leaps of intuition. More importantly, it is a system based only on object knowledge, knowledge that is independent of the presence of humans. As was mentioned with the table example, this appears to be only true of some knowledge. There is another kind, interpretation.

An alternative school of thought on where knowledge comes from was the empiricists, such as Locke. They argued that knowledge comes from experience. This can be divided into two dialectic parts. The first part being the so-called “objective knowledge” that comes in through the senses. These include sight, hearing, smell, touch and taste; with sight being given dominate role. While hearing is included, language is traditionally not. Later, the role of action was included, as some learning comes from doing things. Reasoning is traditionally separated out from being a sense because it forms the second dialectic part. These inputs are not neutrally received, rather prior concerns act as a filter. It is sometimes useful to use the “bar-room” metaphor to explain this. Imagine the brain to be a busy, noisy bar, with the people being the inputs from all the millions of nerve ends around the body shouting messages to the brain (the barmaid). The organs will be complaining they want food, the feet ache, your memory saying you got badly criticised for a previous measurement and the eyes reminding you that the sky is still blue. The role of the brain is to prioritize and interpret these messages in order to interpret some particular experience. People’s present concerns determine which of these sensory inputs get priority.

Where Arguments (Ideas) Come From

Somehow, out of this noise ideas emerge. In more everyday terms, there does seem to be two sources [Agar,1986]. First, some people come through the door adamant about something. Previous experience has led them to a poorly supported, but often strongly held conclusion, which is either novel or contra to popular belief. Typically, they see inquiry as the collection of more evidence to support their argument. Second, people start with a few key-words, like e-commerce, privacy, community, or Developing Countries and then move on to asking themselves *questions*. Examples include, “What use is the internet in less developed countries?” This appears to be a useful way to deal with the confusion and uncertainty of “problem definition”. Interestingly**,** Crosswhite [1996] disagrees, at length, that this is really the first step. Using the evolutionary approach he points out that, in a child’s development, asking questions comes after making claims. Children start by making assertions and only later learn to question as a form of gathering evidence.

Consider the simple example of a young child trying to satisfy a need, interest or concern for food. She may have seen food put in a cupboard. But it is locked. She will make assertions and test them. “If I pull hard the door will open” … she tries that and it does not work. “You can get in from the back” … so she tries that but the back is blocked from view. She is using an argument or dialectic with herself to learn. After a period of socialisation with other humans, the child may feel able to formulate a question, inquiring what their best guesses (assertions) are about how she might get to the food. So, she may ask her sister, “How can I get into the cupboard?” Her sister may then supply a few assertions that can be tested. But the questions were not really a device for creating knowledge; rather they are asking another language competent human to come up with some arguments. It is a way of extending one brain into a network of brains in order to come up with new arguments.

An alternative approach to explaining the source of ideas is to use the evolutionary metaphor. Knowledge is “born,” nurtured and reproduces. The birth is an idea, a thought, a claim: as with any species these are random mutations of previous knowledge. Most mutated ideas are trivial or nonsense. Many are the result of something said or observed when concerned. So (in the great tradition of politics and economic theory), imagine yourself marooned on a desert island and you are trying to figure out how to build a turtle trap. The child-thinking situation applies. I suspect your thinking process will be something like this; first you will come up with an idea or claim, “It should be built *this* way,” then you would argue with yourself (dialectic) why it may work or not work. The process, while only with you, is still one of putting up a thesis (argument, claim, proposition) and then thinking of the counter arguments (antithesis). When convinced that the knowledge (idea) is worth a try, some resources are committed – in this case to set up some empirics. The results of this “learning experience” are then used to argue with your self what to do next. If other people joined you on the island, then they would simply add to the contribution of ideas that come into your head. When others are present, it is essentially the same process. Of course, other variables are added, such as some group member may act “politically” to suppress ideas or to promote their own. The process is: someone puts a claim, and the others react.

So, claims need to be tested, both by the creator and by the community. This is where the dialectic comes back in. Hegel was not a supporter of objectivism. Rather, he thought knowledge was socially constructed so he supported the work of the earlier Ancient Greeks in saying that the dialectic is important as a device for creating, testing, communicating and gaining commitment to new, tested knowledge in the community. While often attributed with saying that a thesis is countered with an anti-thesis and so emerges a synthesis**,** Ulrich [1980] feels this is too rigid a translation of Hegel’s work. Rather he sees the dialectic argument process as one of socially constructing knowledge by folding the advocates’ perspectives together.

Put another way, this dialectic method acknowledges that much of the work of researchers and knowledge designers involves negotiation – something experienced designers of human systems know. Mason (1969), one of the founders of IS, was a supporter of the dialectic method. He did his PhD on the topic. He describes a case study where the dialectic method was explicitly used to determine a company’s corporate policy. It was made explicit by asking for two contrasting strategies to be developed prior to these being debated by senior executives. Habermas, with his Communicative Action [Ulrich, 1980], also supports the argumentative dialectic for the production of good, universally accepted, knowledge. His work provides the “courtroom” rules for a reasoned debate. These rules are designed to minimize the power effects and so allow a reasoned open and fair debate. But power effects can still discourage a debate from taking place, if only by withholding funding for face to face debate to take place. In commercial, hierarchical organisations this can be a problem. Holding “court,” is an expensive use of designers’ time and a possible threat to their authority, however, on balance, it could be of important long-term benefit [Mason, 1969].

Bias vs Repeatability

The typical reaction to hearing about the use of argument as a method of inquiry is that the researcher is ‘biased ’. It is important to rethink any beliefs you have about “good” researchers being unbiased. We are a hierarchical herd species; human group activity is very much about persuasion. Many readers will have been told in school physics or chemistry class that researchers should be *unbiased* (impartial) in the collection and reporting of their work. The line of thinking continues, which sometimes gets confused, is that to be biased in research is almost like being dishonest. Bias may exist but it should be unintentional, implicit and unconscious, applied by well meaning researchers but a “weakness” that should be avoided.

This myth continues that this type of bias is a minor problem to a good, well trained researcher. Mitroff [1972], one of the pioneers of IS, disagrees, "if the scientist… is not a staunch partisan advocate for his theories, hypotheses, and positions they may be too readily ignored." He thinks bias is good. The argument method aligns with Mitroff. Extensive bias is not only unavoidable but also very desirable. Further, any pretense that people can be trained to be unbiased is not only futile and dangerous but it is also a mistake. Anything that hides bias is not recommended.

However, there is another concept that is important, and which sometimes gets confused with bias. It is useful to distinguish between being *unbiased* (impartial) and having several people *agree* over something. In the classic scenario, a scientist does a laboratory experiment and shows that if X and Y are mixed under certain criteria then the result is Z. It is important that anyone repeating the mixing procedure gets the same result. This repeatability is maybe best not described as being an unbiased result. The experiment chosen was the result of a bias, and an interpretation of the result is the result of the background experience of the relevant scientist and therefore contains biases. More importantly, the experiment would be seen as "convincing" because several people, including critics, can *repeat* the experiment and get the same result. It is the fact that it is repeatable that matters. It is convincing because several people did interact and get the same result.

Broad and Wane [1982] point out there has hardly been a famous scientist that has not been a political player. One example, from a near endless list, is that Newton was Chair of a committee he set up to decide if he or Leibnitz invented calculus. He wrote up the concluding report himself. The report concluded that Newton invented calculus. Armstrong [1985] and Maloney [1977] conducted trials on journals and found well known researchers, with supporting evidence for existing theories, were published more readily than other submissions. The wide range of so-called Pygmalion experiments in psychology found influencing researchers prior to the experiment could change quantitative experimental results. A classic find was that if new (blue eyed) schoolteachers were told children with blue eyes were more intelligent than brown eyed ones, then this result was born out in the new teachers' grades. This research has been repeated with blue and brown eyes. The point being that researchers are biased, therefore need to provide research results that convince people who are aware of these biases.

Another way of seeing the inherent bias in research is by considering the case of the mole rat. A western biologist recently speculated that it was possible for mammals to have the same social order as ants and bees. These have the well known social order of a single queen, a few drones and worker sisters. However, to date this researcher believed no similar mammal social order had been found. One day, a lay person living in Africa heard this biologist talking and pointed out that, in his country, there was such a species, called the mole rat. The Western biologist went to see the mole rats in their habitat and confirmed their lifestyle back to his colleagues in the US. He was heralded as having "advanced knowledge." However, to the African children that played with ants, bees and mole rats everyday, this was hardly a great leap forward in knowledge. The point being that new knowledge is often only rediscovering something or only reporting it to your "tribe," where it may be "new knowledge."

Lakatos [1978] sees bias in a more proactive way. He argues that we need bias to create knowledge from an observation. To use his terminology, observation is theory laden. That is, people tend to see in observations what they are looking for. Kuhn [1970] reinforces this when he talks of paradigms or worldviews, giving interpretations to things that go on around us. Rather than strive for the Holy Grail of unbiased research, it may be better to assume bias, conscious or unconscious, and think of a knowledge collection method that acknowledges bias. That brings us back to Aristotle and Hegel's dialectic, the reasoned debate, the argumentative process to validate knowledge. The original researcher may be biased, all be it at the unconscious level, as may be the first people that get into reasoned debate about the research. However, the role of the argumentative process is to make the bias explicit and work with it. As with any debate, parties take sides and explore their own point of view while being vetted by an opponent. While care has to be taken to keep the debate from becoming angry, the sought outcome is a balance, maybe a compromise, a synthesis.

To recap. It was hoped that some of the discussion above went some way to convince you that knowledge is at least partly created (learning occurs) through debate between people. It acknowledges bias and provides a means of testing self reflection. This argumentative approach to the creating and testing of knowledge does have a good pedigree. While bias is required to create knowledge, it needs to be made explicit. It should not be confused with the need for repeatability. Evidence that people can repeat is convincing, yet this is not possible with complex social situations. Rather, alternative perspectives need to be sought. Reasoned argument is a way of exposing and examining those perspectives.

Argument was defined as reasoned debate, negotiation or understanding, talking to understand. What are the alternatives? The powerful simply dictating to the less powerful; self-proclaimed intellectuals telling the lesser mortals; violence maybe; or the use of mathematics? Bertrand Russell proved that mathematics is not pure logic but rather full of leaps of faith and personal interpretations. Pure predicate logic has been tried by the rationalists as a knowledge gathering and testing device, but it has proved too restrictive. The empiricists such as Locke, supported by the American pragmatics, suggest learning by doing, using the senses, experimentation, through trial and error. Argument drives this process and acts to provide some common consensus on interpreting what has been experienced. An argument does not need to be a one on one contest, rather ideas are discussed at the same time, but the guarantor of some useful inquiry is competition through a very human process of claim and counter claim.

Remember the Audience

Thinking of research as an argument is also useful in so much as the 'process' of inquiry is more realistically presented. There is a medical doctor in Western Australia who is convinced that some types of stomach ulcers are due to a complex bacterial infection. The cure is a complex mix of antibiotics. He figured this out ten years ago. He does experiments where he gives himself ulcers, gets an independent verification, then takes the antibiotics and cures himself. He commented recently that, after ten years of providing proof, he had managed to convince a growing number of doctors, maybe up to 10% to date. While this story supports what was said above about "scientific" evidence often not being immediately convincing, it is an important issue because it points out that knowing is a "process." It has a time line – after the researcher becomes convinced, others need to be convinced. A communication campaign needs to be developed. That research involves a long-term process of persuasion is a point often not made fully explicit in many research methods texts. In the majority of cases, many so-called "facts" are not immediately obvious. Some people, mainly filmmakers, give the impression once a carefully controlled experiment has been done, there is no room for debate. The facts speak for themselves. This is wrong. The observation is the easy part, convincing others of how it is to be interpreted is the long hard part.

Thinking of informing as an argumentative *process*, first to convince yourself and then to convince an ever widening audience, is useful. The evidence involved should be designed to satisfy your worst critic; be it reasoning, an experiment, a history, or reporting conversation. Otherwise, you will not even start to convince, and therefore fail to inform. Your opponents, and it *is* an adversarial system, will just dismiss the knowledge you are trying to hand over, saying it is unreliable, ill informed. Moreover, even if you use a collection method your critics would have trouble criticizing, they may well then question your interpretation of the facts. However, this is how new knowledge should be tested. But you need to expect to go through this process. When it is not possible to question, new knowledge problems arise. The Nazi and Stalinist Governments promoted much of their "knowledge" as being the result of scientific research. However, they suppressed the argumentative process and so promoted the dissemination of some very bad knowledge.

We often rank new knowledge by the quality of the source. At first flush, this appears to be wrong, if nothing else, because it will encourage popular people to become a credible source of knowledge which is outside their expertise. Aristotle mentions this in Rhetoric and more recently Walton [1998] points out the limitations to the cliché, "avoid appeals to authority." The advertising industry knows that *who* is doing the convincing does have an impact in practice. In its most crass form, entertainers (including sports celebrities) try to persuade us about what to eat, smell like and wear. That the source can be influential in what we rate as good knowledge is something many of us will acknowledge begrudgingly. If people we respect tell us something, then we have a greater tendency not to question it. So, during the process of collecting new knowledge, the campaign to convince may need to give some consideration to whom to solicit as the initial supporters. External examiners with well-known names, respectable journal editors are popular examples. First, convince these and others are more easily likely to fall in line. This is pragmatic, a heuristic, that will assist in the convincing process. Of course, it is not being suggested that bad knowledge should be passed on in this way, merely that it provides a quicker way of passing on good knowledge. This method is used with expert witnesses in court. First, a witness gains the respect of the jury for an expertise in a certain domain and then is asked to evaluate new evidence.

When starting a piece of research, it is very important to know your audience. How can you convince people of anything without knowing their background and what they have been discussing in the recent past? You may be trying to convince them of something they already know. They may give certain words different connotations to you. This means reading the available literature and, when possible, talking to those working in similar areas. This initial stage of research might be called "wallowing in the literature" but what is important is that the past "conversations" of the audience are being appreciated. Knowing this background, the context, into which you intend to push your conversation, is relevant. It is analogous to visiting overseas strangers; it is both respectful and wise first to get some appreciation of your unfamiliar host's background and opinions before launching into your own proclamations. Apart from anything else you are more likely to get your argument accepted.

The Argumentation Process

Strictly speaking, under the argumentative approach, the search for new knowledge cannot be said to start in earnest until a one line claim (the argument) can be stated. The argument gives the researcher their "point of departure," their eyes to seek what evidence is relevant and which is not. For example, the argument may be, "that the DHS policy in Country X will not succeed." An argument might be called a conclusion, a claim, a proposition, an assertion or a thesis. It is not a hypothesis (below the thesis). Hypotheses are a series of tests that will be designed to support the argument. There does seem to be two conventions about the use of the word "argument". To some, it is the entire thesis or report. To others, it is a "one liner." Without any real conviction as to which is correct, for the sake of standardization, here the argument will be the one-liner. Evidence is presented to support that argument.

Why argument rather than questions? People typically ask questions of those they feel have more experience. The Premier might ask a mechanic how to fix his car. You would not expect a lecturer in mathematics to ask her students how to solve a simple mathematical problem. It would be embarrassing. To ask someone a question is a mark of respect for their experience. I am told that, in the Indonesian culture, this can lead to people making up answers to questions simply because saying, "I don't know," may hint at the person asking the question having made an embarrassing mistake in asking this person that question. Questions can be used to soften any appearance of hierarchy. Rather than order, "You lads put that over there, then pick this up", a more experienced designer might say, "What do you say to putting that over there, then having a go at picking this up?" By putting an instruction as a question, the implied message seniority is softened. Of course, asking questions can be used, as done by teachers, to threaten and test more junior people. But really these are rhetorical questions. For example, when a teacher asks a 10 year old, "What is the name of the world highest mountain?" the teacher thinks she knows the answer. Originally, one can imagine such questions to be well-intentioned pretense of respect. "Please tell me the name of the highest mountain." However, throw in some power, arrogance, apathy and tiredness and rhetorical questions can become intimidating and threatening. The point that I am attempting to make is that, although questions get used in all sorts of ways, genuine questions are a genuine attempt to secure some more assertions that can be tested.

At an early stage, a researcher may not be sure of his/her argument, so might ask questions. This usually only occurs to researchers very new to a topic. When nearing the point at which the argument is known it may be possible to formulate the argument in the undecided form, "This DHS policy will (or will not) succeed." Prior to the final write up of the research, this uncertainly will have been resolved. Even stating the argument in a thus undecided form DHS preferable to "research questions" which, as was said above, give a dangerous aura of impartiality.

When the researcher DHS clear about her argument, she will need to remember how she convinced herself. Her audience will ask many of the same questions as she did in coming to her conclusion. If the audience has a very different background from the researcher, they will have very different questions. Typical questions that arise from an argument like, "Their IT policy will not work" are "What do you mean by DHS policy?", "Why are you interested in this topic?", " Who designed the policy?" and so on. These questions guide the structure of the evidence needed to support the argument and convince the audience. It may be worth using the old 6 "w's" (who, where, when, how, what, why) questions to check for scope. Fisher and Forester [1996], restates these 6 w's are also the requirements for writing a good story; the players, the scene, the plot, the acts and the message. Further, this should reveal all the stakeholders. So, with the argument, "Their IT policy will not succeed," this would ensure that, not only the perspective of the planners and users is considered, but also any other persons affected by the policy.

A useful response to, "What is your research question?" would be, "My questions or my readers questions?"

What and Why

Care has to be taken to ensure that there is a common understanding about the words used in your argument (claim). Silly to have the wrong debate. But as most University researchers have already received a modern education, much of this can be assumed knowledge now. As the argument method supports the idea that knowledge is socially constructed, it is inappropriate to seek concrete definitions of words. One writer cannot dictate how all her readers should use a word. Meanings change and interpretations alter. The original meaning of 'bureaucracy' was meant to be to a compliment. Today it is more insult, yet used formally to describe the inevitable process of Government decision making. Rather, writers can say how they intend to use a word, hoping the reader will be able to accommodate the intent. It is the concept (essence) behind the word that is sought. Thus, in my example of IT policy being inappropriate, it would be necessary to discuss words like "IT", "policy" and "inappropriate."

It is common to follow a statement of the argument and the definitions with some statement of *why* this argument is important, both to the author and the audience. Both rational and emotive reasoning can be used here. Walton [1998] has summarised the reasons why and when emotive arguments are appropriate. They do act to motivate, further they do sometimes help the reader form a picture of the issue in their head. Metaphors are very useful for this, especially if the motivations are fairly "tacit." The tradition of interpretive research suggests that the background (and thus motivation) of the person doing the interpretation be included here. A person with an unusual background might be doing the interpretation, else someone who claims to have particular insights from work experience.

Evidence

The point of the evidence is to support the argument. You have made a claim, now defend it. Using the courtroom metaphor, you are the barrister who has made a claim about your client, now you must bring supporting evidence. This evidence can be of several types. Socrates (from Plato) thought there were two types of evidence. What has been translated as reasoning and induction. Reasoning being well known, of the form, "If X and Y are true then it must follow that Z is true." By induction, he seems to mean generalising from everyday experiences. An example may be, "As many of you will know from *experience*, a lack of clear policy means confusion and wasted resources. If this is true for running a corporation, how much more true it must be for the country as a whole." *Experience* being evidence gathered through the senses, empirics. While agreeing with Socrates, we have become much more ritualised in our knowledge gathering sources and resources. We know people can misinterpret their everyday experiences. We now use a huge written literature, experimentation, and interpretive methods to replace experience.

It seems wise to think of the "literature" as the voices of expert witnesses. You will want to provide evidence to support your argument. Other researchers may have done similar or adjacent research that goes some way to support your argument. These other researchers can be presented as expert witnesses. It is your argument – you decide who and what part of their work you want to present and how (in quotes, summaries etc.) A distinction needs to be made between what used to be called a "fallacy of argument" by using an appeal to authority and the effective use of expert witnesses. Walton [1998] discusses the important difference. An expert is someone who is trusted to have a special area of experience. Those who publish in well-respected academic journals may be presented as experts because of the experience required to publish. They may have conducted exhaustive experimentation, may have an unusual perspective of some issues or may have years of organizational experience they are drawing upon to make claims. It is the decision of the audience of your thesis to decide whether someone you present as an “expert” has sufficient experience to be convincing. You will need to explain why you think the witness is an appropriate authority. This is analogous to a court jury having to be informed of the background of a forensic scientist before evidence is given.

The only guiding rule for evidence is that it is convincing to the audience. Attempts to insist of certain types of evidence as being “scientific” have failed. Vaughan [1997] reports on the causes of the Discovery disaster provides one graphic example. The experiences of a minority are valid evidence as are laboratory experiments in the appropriate circumstances. Reasoning can also be useful evidence, both in its own right and to explain empirics. Many followers of the myth of the scientific method insist on “empirics” as the only source of true knowledge, all else is considered anecdotal. Cohen [1994], in his detailed histories of how science actually progresses, points out this is a myth. Amusingly, he has a more mundane explanation of why scientists only report empirical findings; it is because mathematically skilled scientists don’t like writing so avoid doing it. This has created the minimum style reports which is as per school laboratory write ups. When communicating to other scientists doing research in a similar field, discussion of context and the research situation can be ignored as they are dealing only with inanimate objects. This is far from the case for designers of human systems, where context and perceptions are everything. In these cases, the audience determines what is valid evidence and the complexity of the situation may mean that imagination and experience are the inquirer’s greatest allies.

Conclusion

This paper was about how designer of a human system should conduct inquiries. At the design and analysis stage of a project, this is a very necessary skill. Many DHS projects have gone astray because they were poorly defined, something a good inquiry method would have revealed. The theory of knowledge introduced to DHS by Churchman was given dominance. This sees knowledge as able to be treated as both objective and interpretative because it is socially constructed. Objective knowledge, like the number of legs on my table, is knowledge that society has agreed upon. Why it has four legs is still in dispute and so open to interpretation or multiple perspectives.

The mode of inquiry therefore recommended for complex social situations, where much is still open to interpretation, is to seek multiple perspectives or diverse views. These are teased out and clarified by the use of the argumentative process (debate not quarrel). The power of argument to create and validate knowledge has been known and reconfirmed for over 2000 years; it forms the basis of our legal system. Its components and assumptions were outlined. Some of these are challenging as many readers will have previously been exposed only to the rhetoric of how ‘scientists’ collect knowledge. Not only is this idealized in the classroom but also the scientists’ problem domain of inanimate objects is so very different from that of the designers of human systems who are trying to restructure complex social organisations.

The advice of Mitroff and Linstone, and also of Freud is given in conclusion. For every problem, inquire on three knowledge levels.

1) the technical or professional (physical properties, and laws)
2) the organizational or political (groups can weld irrational power) and
3) personal (common sense and ethical).

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