

ARGUMENTATIVE SYSTEMS FOR *IS* DESIGN

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Abstract

The object under study in this paper is information systems design ISD. The writer's concern is how to institutionalise the powers of reasoned argument into the design process. Argumentation, well known to the decision-making, communications, knowledge creation, problem solving, and research methods literature, is believed to need a more explicit presence in ISD. The evidence is provided to support this belief in the form of a suggested 'court room' analogy, drawing on the management and decision-making literature as well as the theory of knowledge philosophy. Argument has good support from philosophy, confronts the issue of uneven power relationships, is a social construction methodology, and provides structure and outcome to dialogue. Argument is not to be confused with quarrels nor pure logic. Reasoned argument (debate) places language and group interaction at the centre of knowledge acquisition, while still acknowledging the observer-reasoning dialectic.

Keywords:

Argumentative systems, IS Design, decision-making.

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Introduction

Fitzgerald [1996] refers to “the well documented software crisis”, suggesting that the traditional IS methodologies still need some rethinking. As equally well documented are the limitations of these methodologies. Coupled with this, Wastell [1996] expresses concern that some practitioners are over mechanically applying methodologies that provide excessive detail regardless of the context. A methodology should not be so prescriptive so as to enable it to become a fetish, a teddy bear, intended to protect designers from having to think about the complexity of organising for a stakeholder determined outcome. On the other hand, Hughes [1998] found little evidence that any one theoretical IS methodology was being used in practice. Rather, they were cannibalising theoretical methodologies to suit the situation. The reasons for the failure of the methodologies are still unclear but two issues stand out. One is the issues of power inequality, which exists in most organisations, and which appears to act to impose systems opposed by some stakeholders. The second and related issue is how to generate innovative designs.

Merely calling for multiple perspectives through mediation with all stakeholders is not sufficient. Relativism needs to be avoided. A project needs an owner, someone who is responsible for a reasonable outcome from her point of view. This automatically brings some level of conflict from stakeholders who may want different processes or outcomes, which in turn causes resistance to consideration and submission of design ideas. There appears to be a need for an approach that can work with detailed methodologies to address these problems. While it is not being suggested a utopian solution is at hand, a process that has the potential to turn argument into idea creation is outlined.

This paper first presents and then justifies a strategic module that can be added to existing methodologies to address the power and consensus issues as well as the idea creation issues. Rather than solve the power issues, this module aligns them with the way they are addressed by the wider community, which is rather untypical of most commercial organisational practices. The system includes an arbitration process that allows public debate before an independent audience: a Court. Correctly constructed, this provides a pragmatic way to deal with disputes, ensures good communication, and enables the project owners to say that a transparent process was followed. A series of well structured debates, built into the IS design process, is a familiar democratic process and may be the best alternative for dealing with issues that are causing some tension.

Perhaps more important (see later), the process of public debate as a process of transparent argumentation, creates knowledge through language [Ulrich, 1983] and the interaction of perceptions, by using the ‘guarantor’ of competition. This has been recognised by many philosophical writers from Aristotle to Habermas to Churchman. The layout of the paper is to first present a protocol for institutionalising the argumentative process aimed at both dealing with power inequalities but also as an idea generation mechanism. It is a re-visiting of Mason’s [1969] dialectic strategy formulation method, but avoiding the expense of drafting two plans and not expecting consensus or synthesis.

It is not being suggested that the court case system in the wider community is perfect, that it provides consensus, or that it reveals *the* truth. In the US, the paragon of litigation, there is a growing backlash against “going to court.” Walker and Daniels [1993] outline some alternative dispute resolution systems, but interestingly, the basic structure of setting up a formalised debate is not but aside, merely the cost and authority of the State’s legal system. Formalised argument is about the best system our competitive hierarchical species has managed to come up with in 3,000 years of civilisation. However, it does it provides a outcome. There has been some attempt to label an argumentative process as too adversarial, but “mere dialogue” offers no guarantees of a resolution. Dialogue appears ultimately to need structure, especially in a commercial setting.

There are two basic court systems. One is well known to Australians, North Americans and the British. It is the adversarial system with a prosecutor, a defence lawyer, and a jury. The judge cannot call or ask questions of the witnesses. The other is the system used in Royal Commissions and some European courts. The judge is able to call witnesses and make inquiries of who-ever she feels is relevant, in order to be able to work out a fair result. It is unclear which one is preferable, but the objective must be to ensure fair due process. A balanced adversarial presentation of evidence lies at the core of the system recommended by Aristotle to create and test knowledge. The setting up of “sides” is thought to provide more inventive defences, and appears more explicitly to address the risk of unequal power differences. The disadvantage is that it can be very divisive. Each side does not necessarily put the truth, but rather the best possible version to support their side. This can cause tensions. It is hardly a healing, consensus building process; but maybe hopes of harmony and consensus are naive in a hierarchical species co-competing for uneven economic gain. At least there is a process and a result. While the adversarial systems will be discussed in this paper, practitioners may wish to try alternatives.

Design Court

“In this [method] a writer shows what are all the theories held in regard... and then, by excluding one after the other for convincing reasons, leaves at least a strong presumption in favor of his own plan.” [Baker and Huntington, 1905]

In the wider community, extreme (non violent) arguments are typically resolved by reference to the ritual of the court case. Ritual is now well recognised as an important, even inescapable, part of decision making in order to gain a group determination [eg Gimpl and Dakin, 1984]. This includes provision of a very symbolic “pause in the process” to allow time for a ritual to take place so that minority stakeholders get a clear time to express their concerns (their day in court), or at least stop to concentrate on the reasoning of the dominant stakeholders.

The topics for a formalised debate need to be selected very carefully. The formalised debate (court-case) approach is only practical for the big decisions. What are the big decisions needs to be agreed in an up-front protocol document. While argumentation (debate) occurs continuously in organisations, what is being suggested is that the process be formalised for certain key decisions. The decision topics (claims to be argued) will be unique to each situation but may start from the decision to change the IS presently in place. Clearly, every single issue cannot be debated formally due to time and resources constraints. Practical reasoning suggests that a decision be made to have the first formalised debate, and the results of that can be used to

determine any subsequent formalised debates. It is expected that earlier debates will be more general with a call for more specific issues being raised.

One possible approach to identifying the major decision is to use the classic planning cycle, such as,

- that a new system is required,
- that the best way to select the new system is X rather than Y,
- that new system M is better than new system N,
- that the best way to implement the new system is A rather than B, and following implementation,
- that the selection and implementation of the new system was a success.

The Multiviews II methodology suggests a different (or maybe a subset) classification of the major decisions. These are,

- Organisational Analysis: That, this IS is the best alternative to fulfil the following organisational needs
- IS Modelling: That, the model presented reflects all the relevant objects and their inter-relation.
- Sociotechnical: That, the best plan to implement the new IS is....
- Software: That, the optimal structure of the software is....

Clearly, each situation is different. The major decisions will need to be set up-front, with some means of altering them as the project develops.

Identifying those who wish to argue is also important. Often referred to as the stakeholders, the players or the advocates, their selection will reveal the truly democratic nature of the IS planning. Unions may be set against the company, or consultants against the IS staff. Each needs similar skills and resources. While there may be several stakeholders, dialectic is necessary for the court case, so some means of aligning the decisions being debated to the stakeholders is required.

There should be a clear statement of what is to be claimed, who is to defend the claim and who is to counter. The evidence to be presented must be available to all parties before the trial starts. A “judge”, or facilitator, runs the process, including the final summing up to the “jury”. A carefully chosen jury of (maybe) “independent ISD consultants” will declare what has been decided and what still needs to be decided. Stakeholders make up the witnesses. The person defending the claim will present their evidence first, each part being open to questions in a well-controlled manner. The Counter will then present their case, while being open to questions. The Defence should then do their summation, followed by a shorter summation by the Counter. The stakeholders direct their concerns to either the Defender or the Counter prior to the start of the debate. The role of the jury is to make suggestions as to what should be done next. This may be a direct decision, or it may be a call for more information. While 12 is a traditional number for a jury the group literature [eg. Metcalfe, 1995] suggests that a number between 5 to 7 would be more productive, unless an electronic meeting facility was being used, in which case 12 may be

practical. Thought should be given to having a different jury for each debate. It is important to remember the innovative and reflective purpose of the debate, but also that a conclusion needs to be reached amidst a variety of vested interests.

Evidence presented in order to support an argument can be initially sub divided into empirics and reasoning. Empirics (through the senses) includes any information, such as statistics, experience, results of questionnaires, or experiments. The second type of evidence, reasoning, uses the mind. For example, when presenting research arguing that: system design X is better, observation evidence could be presented on the improvements by previous users, or what users (witnesses) say about a system. Conversations with experienced designers and budget reports may provide further observational evidence. Reasoning evidence may take the form of explaining the designer's priorities and how they affect the system's usefulness. Typically, the interpretive nature of the argumentative approach allows all forms of evidence not just quantitative, including historical and contextual evidence.

The attraction of the court case approach is that it encourages multiple forms of evidence, interpretive and quantitative as appropriate for the audience. So, for example, those presenting their case can judge the importance of history and context in changing peoples' perspective. The approach also emphasises the appreciation that systems development is about dealing with people's concerns rather than objective problem solving [Metcalf, 2000].

ARGUMENTATIVE SYSTEMS

What has just been described is in the general sense an argumentative system. There has been a lot written about why such systems create knowledge, meaning that they are both a research method and a pragmatic means for obtaining a group consensus.

Objectivity results from the heated, intense, and biased confrontation and struggle between the somewhat biased ideas of somewhat biased individuals. That which survives the process is labelled objective..." [Mitroff, 1972]

Hirschheim et al. [1997] advise that a desirable attribute of an IS Methodology is "to provide a learning methodology to support debate on desirable and feasible changes". This aligns with Aristotle's understanding of debate and Hegel's understandings of how consensus knowledge is acquired. However, debate is not a technique that sits easily with so-called scientific management. It comes down to a matter of one's belief in "objective knowledge". If you believe that the truth, of which is the best system, is out there waiting to be found by good designers, then you believe in "objective knowledge." However, if you believe that the "best system" is a *socially constructed* concept, which is only possible to define through participants' consensus, then the relevance and importance of debate is more obvious.

Some methodologies align with the socially constructed view by calling for consensus and consideration to be given to the views of all stakeholders. The purpose is to assist with the integration of the technical aspects of ISD with the organisational and social ones, to allow for a clever implementation both in terms of the end product and the implementation process. This is a very strategic – maybe even a little naïve – advice, much like pointing out which direction to

face before taking a “first step” in the ISD maze journey. It does not address the practicalities of how to manage the interaction of stakeholders so as to optimise power issues, innovation, commitment and commercial need. The history of mankind, personal experience and the philosophical history above suggest that the best way to address these practicalities is to take Aristotle’s advice and look to formalised, explicit, argumentative process.

Briefly, (as it will be developed later), the argument methodology uses a process of formalised debate between all interested parties as per a court case. An advocate (analyst) defends her design against those that ‘counter’. Naturally, a good advocate will anticipate the counter arguments. The jury measures success. This process can be applied to resolving conflicts brought by differing stakeholder needs. It operationalises the mediation role of change agents.

The argumentative methodology is being used at present, albeit informally, in practice. If Scult [1999] is correct people cannot help but do so because the use of persuasive language in group interaction is an ontology¹, a way of being. This paper merely provides a metaphoric label to make the method more explicit, a philosophical base for why the method should be given more attention, and a more formalised modus.

Argument and Decision Making

So, what exactly is the argument method, and how does it overcome some of the problems inherent in doing effective IS development? First, what is a reasoned argument? Argument is the noun of arguing or argumentation, the directed construction of convincing evidence [Perelman and Olbrechts Tyteca, 1969; Eemeren et al., 1987], the argument being the one line claim (conclusion) that is supported by various evidence. The courtroom analogy has been mentioned. Court protocol has also been designed around the open public forum approach suggested by Aristotle. A court case is a research activity, the courts are also searching for knowledge, indeed, the truth. Evidence is presented to a universal audience (jury) sufficient to convince them. In a court room, the argument is typically about a person's guilt. In IS development the argument is more likely to be something like: that system design X is preferable to design Y. It is not possible to say what will be sufficient to convince the audience. Hopefully it is sufficient just to say:

In an argument, reasons are oriented in favour of the conclusion... argument is accepted only if the reasons it provides seem plausible, relevant, oriented in favour of the conclusion, and sufficient to support it [Apotheloz et al., 1993].

Eemeren et al. [1987] also provide a definition of argument:

Argu[ing] is a social, intellectual, verbal [spoken or written] activity serving to justify or refute an opinion [idea, conception, policy], consisting of a constellation of statements and directed towards obtaining the approbation of an audience.

¹ Scult [1999] argues that Heidegger thought Rhetoric should be thought of as an ontology, **since** (as) group rhetorical interaction is a basic action of being.

Eemeren et al (1987) go on to explain their definition. They start by pointing out that arguments are a social activity because there needs to be two people present, holding two different world views. This is very relevant here because the argument approach, the dialectic, is about gaining a determination from differing views, to the extent that Crosswhite [1996] sees reasoned and structured argument as a means of avoiding hostile conflict. So argument is an intellectual activity, "an activity of reason", where emotion (aggressive or tearful) is "subordinate to that of reason". Eemeren et al. (1987) contrast this with hierarchical communication, which is so typical of commercial organisations. It address the power issues. The cornerstone of the courtroom system is that there should be little room for bullying to hide evidence. So, the act of professional arguing should align itself with the accepted ethos of scientific decision making.

Eemeren et al. (1987) go on.

Argu[ing] always refers to a particular subject concerning which opinions can and do differ...all scientific, scholarly, areas of human knowledge...without any exception whatever, may be the subject of argument." Yet, "Argu[ing] requires the use of language.

They continue,

Argu[ing] is offering, defending against, taking account of, and anticipating criticism. Argu[ing] consists of a constellation of one or more statements ... The common feature to both pro arguments and contra arguments is that both forms are directed towards testing the opinion.

Research, and convincing, are the cornerstones of good argument.

...the logical articulation or intellectual cohesion that makes an argument tight comes from thought and not from the mere recitation of the facts or instances [Zieglmueller and Dause, 1975].

They also put this the other way around:

Research skills stand at the very heart of the inquiry phase of argu[ing]

Both in the sense of providing good information for making decisions, and for assisting with the act of actually making the decisions, setting up a well managed process of argumentation research appears to have a philosophical basis and is integrated with the best scientific methodology.

Even in the psychology literature the role of reasoned argument for the very tasks confronting an IS systems designer is supported.

"We proposed three elements that are related to conducting research as a reasoned argument: (a) focus on underlying assumptions, (b) avoidance of compartmentalizations of research components, and (c) iterative comparisons of assumptions across components." [Tracy and Glidden-Tracey, 1999]

They go on to say...

“To argue for the choice of a specific approach from among identifiable options requires more careful thought and more careful articulation of assumptions...The onus is clearly on the researcher to build a case and argue his or her point.”

There is an extensive management literature on the use of argument in both problem formulation and decision making. For example, Niederman and DeSanctis, 1995] report that,

“...the structured argument approach led to a greater combination of both coverage of critical issues and consensus...Use of the structured argument approach also resulted in higher satisfaction with the problem definition and commitment to implementing results...”

Meyers and Seibold [1989] provide an extensive review of the use of argument in decision making literature,

“ ...investigators have studied whether utilising structured argument formats (ie. devils advocate or planned dialectic enquiry) contributes to higher quality decisions. Results have indicated that utilisation of both...are useful for surfacing assumptions and evaluating crucial information in uncertain and ill-structured decision-making situations.”

They go on to say “arguments are both the medium and outcome of group interaction”. It is a social practice. Arguments are both a system (observed patterns of interaction), and a structure (the unobservable generative rules and resources that enable argument). This links into the structuration perspective derived from Giddens’s [1984] theory, with culturally appropriate and sanctioned ways of disputing. Meyers and Seibold [1989] go on to align their argument with Giddens’ Theory, saying that argument provides the interaction system (in Giddens’ sense) needed to make a structure. In this paper, this is applied, saying that argument can also be used to solidify a computer based organisational information system. The managerial task is to manage this argumentative process so that individual manager’s private agendas, emotions and power needs, are held in perspective, while allowing innovation and reflection [Schon, 1983]

Myers and Seibold [1989] summarise the extensive empirical research on analysing argumentative processes aimed at reaching a determination in decision making. To date, much of this research has been done using the positivist methods such as quantifying individual and group interactions and trying to predict the decision outcome. However, Fischer and Forrester [1993] report on a more interpretive research on the role of argument in Government policy formulation. At one stage they equate the argumentative literature with the story-telling research methods.

Decisions need to be communicated, and preferably enacted by those involved in the communication. In order to effectively design and implement an IS, especially with respect to senior management, it is necessary to win their hearts. The argumentation approach also offers this opportunity. Users are more likely to be committed to a new design if they have been involved in an argumentative process that was seen to be reasonable. If nothing else, the advantages, purpose, and context of the new system will be better communicated. The management literature supporting the role of argument to assist communications is even more

extensive than the decision-making literature,

“From its beginnings in late nineteenth-century forensics pedagogy, the study of argument has been a rich intellectual tradition in the field of communication.” [Meyers and Seibold, 1989]

A further attraction of the argument approach is that it makes no pretence of impartiality. Pretending to be impartial about the alternatives does not work in scientific inquiry [Broad and Wane, 1982] and causes offence in the political hierarchies of modern organisational life. Much time and emotion is saved if each actor openly states his or her preference, or claim, up-front, rather than pretending to present impartial questions. Crosswhite [1996] argues that this aligns with human development where claims are learnt before the skill to question.

Action research (IS style) [see Baskerville and Wood-Harper, 1998] and Soft-Systems methodologies, including Multiviews, advocate that designers approach their task with an explicit, up front, intellectual framework. This aligns with the argumentation approach, in so much as it states the purpose up-front, quickly making the reasoning explicit. One of the attractions of the argument approach is that it is not aligned to one evidence collection technique; the only guiding principle being that a universal audience should be convinced. Thus the action research approach of rolling over research methods in an interactive, reflective manner can be done in conjunction with the argument method. In both cases this also means that it is hard to generalise from one situation to another, except maybe to say that the actor is “richer” from the experience, in the same way a study of history can make you richer but hardly a predictor of the future.

Rolling Reflexive Methods

The mining metaphor has been used to describe the “objective knowledge” epistemology. Truth, or knowledge, is perceived as being like gold deposits under the ground which researchers need to dig up. He contrasts this with the traveller metaphor for the interpretive epistemology where knowledge is socially constructed. Here the researcher is a traveller on the road of life who occasionally comes across other people. They talk to each other about their experiences for a while, then part. The world-views of both are altered by the experience. Note that in the objective knowledge epistemology it is assumed that the “gold” actually found, plus that still remaining in the ground, was not transformed by the mining process. Therefore, the “mining” can be repeated as if the first study did not have any impact on the problem domain. Put cynically, if I heat up gold molecules three times they respond in exactly the same way each time, even if they are from a different population of otherwise identical gold molecules. It can be assumed that they did not have a memory, that they do not talk to each other about the experience, and that they do not reflect on the heating process and then change their concerns. Sheldrake’s arguments² aside, biological subjects are not the same as molecules³. My point is that humans are so different that even the most general methods for inquiry from the sciences

² Roughly stated, that once something is known by one group of people, then it is easier for others to discover it for themselves.

³ A casual analogy here is the popular comment that a good professor of mathematics can be 25, but a good professor of history needs to be 65 years old.

needs to be re-thought. For example, the method used to conduct social inquiries alters the perspective of both the researcher and those researched both in terms of the usefulness of the method and the problem domain. The minds of all have been altered by the experience. While interaction effects have been well documented in the positivist literature [eg. Armstrong, 1985]⁴ it has always been seen as noise that needs to be minimised to get at the truth. This perception has been maintained partially by also ignoring the need to revisit a problem domain using rolling multiple methods.

Understanding of the added problems introduced with the concept of multiple rolling reflexive methods may be aided by highlighting the time dimension. Using a simple example, imagine you wanted to find the users requirements. Should you do the critical analysis and the semi-structured interviews simultaneously? Or, should you rather do the interviews first, reflect on the comments, and then incorporate them in the critical review? What if the reflection makes you think it would be wise to re-design and redo the interviews? What if those interviewed reflected on what they and others had said and wanted to change their answers? Lets make this worse, what if you do the interviews and reflect on what was said and then realise that you have not defined the problem domain correctly. As an example, consider this: you may have received questionnaires that ask what are you doing about Y2K, which, despite answering, made you reflect that really you were not doing enough. This process of action altering perception is well documented in social inquiry (see below) to the extent it should be expected and built into any decision making plans explicitly so as to confront the issue rather than treating interaction effects as background noise. The argumentation method does just that, partly by providing a mechanism for group reflection.

That a researcher's perception of both the problem domain and the appropriate methods change with action fits well with Schon [1983] and Piaget's epistemology [1972], and Weick's [1983] work. These suggest that thoughts may only really "recall", coupled with a hard to explain skill to be able to generalise from past experiences to a present problem, that is, recognise problem patterns, which is a metaphoric act. The approach considers it misleading to suggest that managers should "think before they act", except to mean that they should recall ways of perceiving a problem (metaphors are useful here), recall past analogous experiences, and then work out how a relevant past experience might be applied to this new problem domain. This makes important the process of reflective "post mortems" designed to re-direct future action.

Philosophical History

A central theme in philosophy is "what can we know", which moves on to "how can we know". How do humans distinguish good knowledge from bad, how do they make good decisions between alternative claims of truth? When a systems designer claims that their design is the most appropriate for an organisation, how do concerned [Metcalf and Powell, 1995] managers identify fact from fiction? Aristotle summarises and extends the classic Greek thought on this matter. He articulates it as being interested in how to gain a determination to stop the domination of powerful cliques imposing their version of the truth. As a result of his empirical experience, Aristotle argues that knowing needs to be tested in debate (dialectic reasoning), and a determination reached. For example, a stick appears to bend in water. The best "practical

⁴ Eg. the pygmalion effect.

reasoning” approach to enable other inquiries to proceed requires a group determination on why this appears so. It is dialectic because it involves at least two counter points of view. But reasoning means more than the axiomatic logic of the Rationalist, it allows the careful use of natural language. The dialectic is both between the antagonists and between the observation and their explanation. It is a technique used to resolve differences in our Courts. In order to make explicit what forms of language were in fact useful in advancing knowledge, Aristotle classified three types of argument in Rhetoric. Walton [1998] extends these to five, and translates the form of argument being suggested here, which is most typical of our court systems, as “deliberation dialogue”; an alternative name may be reasoned debate, or dialectic reasoning. It is in contrast to inquiry argument, which aligns with symbolic logic (the pretended method of science), quarrels (the need to defend ones honour), persuasive argument (the real practice of scientists) and poetry (descriptive use of language).

Implicit in Aristotle’s method is a means of by-passing the problem of objective knowledge, where knowledge cannot be separated from the observer or a determination. This is why he recommended the use of multiple persons’ point of view, the dialectic. While the scientism of modernity does seem to have made progress by pretending that there is such a thing as objective knowledge, the determination-reality gained from historical argumentation studies [Walton, 1998] is that science actually uses persuasive argument. It is not surprising therefore that IS designers in the first years of the 21st century suggest that knowing what is the optimum systems design requires consideration of multiple views. Further, the argument played out publicly, as per a court case with a jury deciding if the argument was made or not, is a pragmatic means of making decisions with different vested interests (power needs) present.

In the centuries that followed Aristotle, Christianity grew in importance and Western philosophy concerned itself with the matter of the Gods. This religious use of “rhetoric” rather drove the use of language in argument into disrepute. By the 17th Century, at the dawn of the Enlightenment, following Newton and Galileo’s successes, philosophers like Bacon, Locke and Hume became known as empiricists partly because they distinguished religion from science by demanding very exact empirical evidence in arguments. This exposes religious, or metaphysical, **and** non-testable arguments. For example, if I wished to argue that God wears socks it would be difficult to provide any empirical evidence. Calling for empirical evidence provides a way of discouraging such arguments. In Popper's language, the socks argument is not verifiable.

While Locke seems to have explained the importance of argument in deciding what is good knowledge, this prosecution of arguments with no precise measurement empirics became a persecution of the rhetoric in argument. The rationalists in Europe, such as Descartes and Leibniz insisted on axiomatic logic being central to knowing what was reliable knowledge, but not the style of argument here being called public debate. They rejected empiricism as too close to objective knowledge and too hard to distinguish from dreams. Kant found the middle road between the rationalists and empiricism, enabling a mix of the two in the phrase, “objects conform to our way of knowing”. This established a practical way of knowing in the absence of objective knowledge, but at the same time allowing observation to count as supporting evidence in an argument.

Hegel rather clinches the dominance of the argument approach, calling for a practical reasoning

as a means of knowing by the presentation of a thesis, and the anti-thesis, and for learning to come from a group arriving at a determination from an overview of these arguments (like a jury). Nietzsche and Hiedegger reaffirm Hegel's approach, calling for practical reasoning and common sense from a community to determine a consensual knowledge. Rorty has reservations; saying, "the attempt to uproot an entrenched vocabulary through argument is always at best inconclusive"; however he may be using a "logic" definition of argument and be talking about major Kuhnian paradigm shifts. The only defence of Rorty's comments suggested here is that a good argument first needs to gain a determination of any language to be used.

So, it would appear that the perception of knowledge collection, and its consequential decision making as involving argument, has been a victim of the Enlightenment. Perhaps now in the post modern period, when a culture has been influenced by the sciences is sufficiently established, there is room to allow the perception that research is an argument and allow some, but not all, forms of rhetoric to inform. This is argued by the late modern and post modern writers such as Toulmin [1964], Olbrechts-Tyteca [1969], Crosswhite [1996], Perelman [1996], and Walton [1998].

Habermas' work discusses the role of language in knowledge creation. His Discourse Ethics [1990] even provides what Heys [1998] calls "a catalogue of rules governing all discussions which together define the conditions of an ideal speech situation", and provides examples, namely 3.2a: "Everyone is allowed to question any assertion whatever". However, Habermas seems to be assuming a "cooperative" discourse with no assumptions of power inequalities or one party trying to persuade the other. A more pragmatic application of argument, especially in commercial hierarchical decision-making settings, is that it needs to be structured so as to acknowledge power inequalities by making it explicit and not calling for consensus. This paper has outline one possible approach.

Conclusions and Implications

The argument of this paper has been that the argumentative process can assist with the design and development of a large complex IS. The philosophical history of argument was presented to demonstrate that it has a credible basis as a means for the acquisition of good knowledge. This includes what is an appropriate IS design. The need for change was presented, as was a summary of the empirical evidence that argument is a practical decision making technique for both the collection of information prior to making a decision and to assist with gaining a determination.

Some suggestions for how the argumentative process might be formally applied in practice, drawing on the courtroom analogy, were presented. This process allows for the management of power issues, while providing a communication tool for reflection and innovation. The argument method is a very useful tool for those seeking consensual knowledge. It acts as a research method, a decision making tool, and an aid to policy setting. Its application to ISD deserves further consideration.

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