Referential Transparency for Dialogic Design Science

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ABSTRACT

Dialogic design science has been developed as a discipline comprised essentially of fourteen principal components. In this paper thirteen of these components are organized for "referential transparency," as prescribed by the Warfield Domain of Science Model (DOSM). The DOSM provides not only useful knowledge for general awareness of the intent of a science, but also ensures a needed discipline for the evolution of a science. Moreover it can highlight the foundation of a science, namely that domain of the science that can propagate from fundamentals throughout the science to its applications. The intention of this paper is to make the linkages among thirteen principal components of dialogic design science more transparent, as an aid in identifying points of engagement for members of the community of practitioners. The approach taken in this study is generically appropriate for all conceptual sciences, where different actors in the community may have loosely informed understandings of their roles. The study of the referential transparency among the thirteen principal components employs the Interpretive Structural Modeling (ISM) method of the science. It identifies the six axioms of the foundation domain of the science as the most highly influential component. On the other hand, the most highly influenced component of the science is the face-to-face co-laboratory of democracy component, which belongs to the applications domain of the science. The DOSM requires that through the application of a science (herein the face-to-face structured dialogic design co-laboratory), a community of practice of the science does have a means of challenging and revising its axiomatic foundation. Such a revision of the axiomatic foundation is relevant at this juncture of the evolution of dialogic design, as it is in the process of transitioning from a face-to-face co-laboratory to accommodate engagement of virtual communities of practice assembled through the Internet.

INTRODUCTION

The Domain of Science Model (DOSM) presented by John N. Warfield in 1986, was not sufficiently appreciated when it was originally introduced (Warfield, 1986; 1987). It espoused the wisdom of drawing distinctions among the four domains of any science, as well as the distinction between the corpus and the arena of a science (See Figure 1). Since the inception of DOSM, all sciences have been touched by innovations resulting from the decentralized network flow of information released through the Internet. DOSM was conceived in an era where physical proximity dominated communities of

science. Roles within the communities of science were typically reinforced through direct conversations. Strong disagreements surfaced readily, and conflicting implicit understandings could be readily resolved. Tensions among roles in the corpus and the arena of a science do still persist, some being strongly anchored in a perceived schism between basic and applied science. The DOSM emerged to recognize that tension and to link the power of its creative friction into a systemic view.

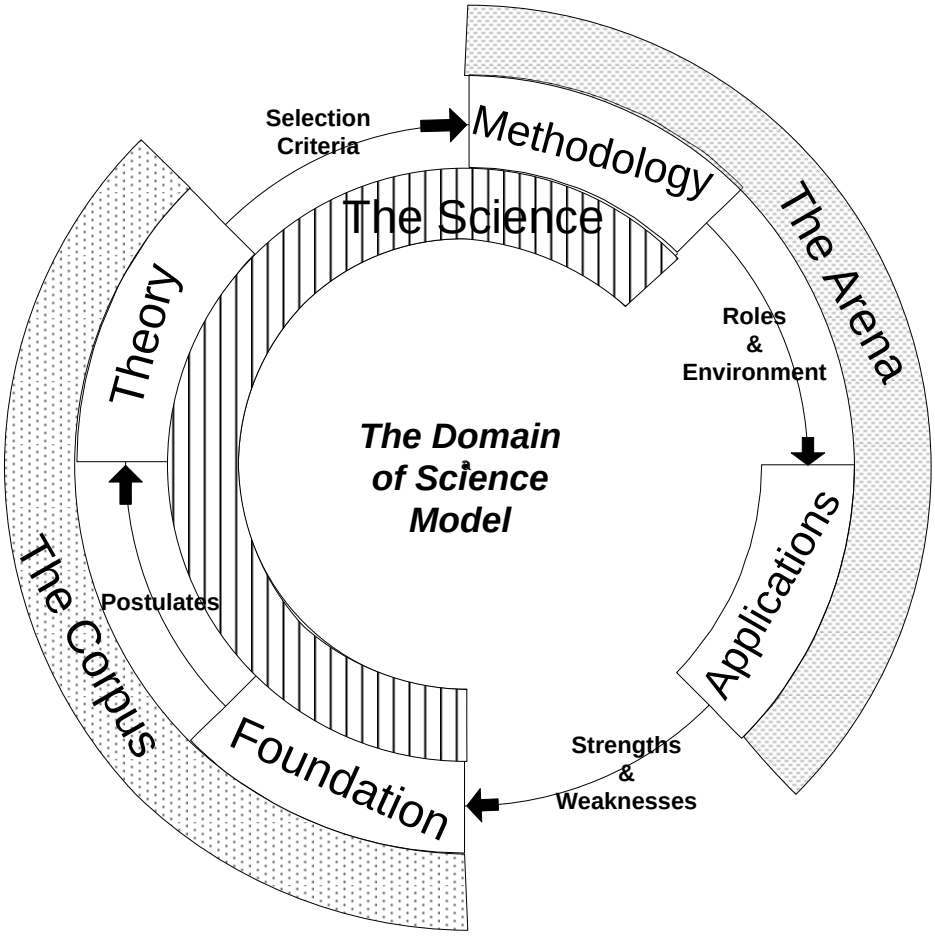

Figure 1. The Domain of Science Model (after Warfield, 1987).

Warfield additionally characterizes "steering functions" which link foundation, theory, methodology and applications in a virtuous cycle which advances the quality of the science. This model calls attention to the flow of experience from applications of the science in the arena upon the foundation of the science; which is to say upon the axiomatic base of the theories supported by the science. It is important that any science explicitly recognizes the axioms upon which it is founded, because disparities discovered in application of the science must be understood first as a manifestation of an axiomatic understanding or a manifestation of something which has not been considered in prior theories.

The Corpus of a Science – or the basic science -- (of Dialogic Design, in this instance) consists of an axiomatic "Foundation" (based upon an evolutionary understanding of the "reality" experienced in the arena of practice), and "Theory" (including sets of theories; such as Theory of Mind, Theory of Relations, etc.). The Arena – or the applied science – shares the "Methodology" (which includes approaches for acting upon, with or through theories in the science) from the science and places those methodologies into "Applications" which interface with and engage the subject of the science (in this case communities engaged in discovering, designing, planning, or creating their ideal futures).

FOUNDATION

The six foundational axioms for dialogic design science are:

1. The Complexity Axiom: Social systems designing is a multi-dimensional challenge. It demands that observational variety be respected when engaging observers in dialogue, while making sure that their cognitive limitations are not violated in our effort to strive for comprehensiveness (John Warfield).
2. The Engagement Axiom: Designing social systems, such as health care, education, cities, communities, without the authentic engagement of the stakeholders is unethical. It results in inferior plans that are not implementable (Hasan Ozbekhan).
3. The Investment Axiom: Stakeholders engaged in designing their own social systems must make personal investments of trust, committed faith, or sincere hope, in order to be effective in discovering shared understanding and collaborative solutions (Thomas Flanagan).
4. The Logic Axiom: Appreciation of distinctions and complementarities among inductive, deductive and retroductive logics is essential for a futures-creative understanding of the human being. Retroductive logic makes provision for leaps of imagination as part of value-and emotion-laden inquiries by a variety of stakeholders (Norma Romm, 2001; 2010).
5. The Epistemological Axiom: A comprehensive science of the human being should inquire about human life in its totality of thinking, wanting, telling, and feeling, like the indigenous people and the ancient Athenians were capable of doing. It should not be dominated by the traditional Western epistemology that reduced science to only intellectual dimensions (LaDonna Harris).
6. The Boundary-Spanning Axiom: Stakeholders act beyond borders to design social systems that enable people from all walks of life to bond across cultural and religious barriers and boundaries as part of an enrichment of their repertoires for seeing, feeling and acting (loanna Tsivacou, 1997).

The statement of axioms provided above were the result of a discussion with a community of theoreticians and practitioners of the science employing a wiki platform over a period of one month. This discussion included participants from multiple continents and can be visited in: http://dialogicdesignscience.wikispaces.com/

A thorough elaboration of the axioms will be presented in a separate publication (Christakis, et al, in preparation). To support an understanding of axioms, a language appropriate to the science of dialogic design was established; at the Foundational Domain of the science familiar words – such as "dialogue," itself -- can take on specialized meaning and new language – such as "trigger questions" or "elemental observations" are introduced. Axioms are the basis for promulgating Laws in any field of science. In accordance with the circular nature of the DOSM, discussed earlier, axioms and laws can be tested in the Applications Domain of the DOSM (the arena) and, if found ineffective, replaced. The Laws of the science are components of the Theory Domain of the DOSM (the corpus).

THEORY

Dialogic design science is constructed upon a set of seven laws which specify requirements for:

1. Variety. The Law of Requisite Variety demands that an appreciation of the diversity of perspectives and stakeholders is essential in managing complex situations. The Law of Requisite Variety is attributed to William Ross Ashby.
2. Parsimony. The Law of Requisite Parsimony states that structured dialogue is needed to avoid the cognitive overload of stakeholder/designers. The Law of Requisite Parsimony is attributed to George Miller and John Warfield.
3. Saliency. The Law of Requisite Saliency states that the relative saliency of observations can only be understood through comparisons within an organized set of observations. The Law of Requisite Saliency is attributed to Kenneth Boulding.
4. Meaning. The Law of Requisite Meaning states that meaning and wisdom are produced in a dialogue only when observers search for relationships of similarity, priority, influence, etc, within a set of observations. The Law of Requisite Meaning is attributed to Charles Sanders Peirce.
5. Autonomy and Authenticity. The Law of Requisite Autonomy and Authenticity in distinction-making demands that during the dialogue it is necessary to protect the autonomy and authenticity of each observer in drawing distinctions. The Law of Requisite Autonomy and Authenticity is attributed to Ioanna Tsivacou.
6. Evolution of Observations. The Law of Requisite Evolution of Observations states that learning occurs in a dialogue as the observers search for influence relationships among members of a set of observations. The Law of Requisite Evolution of Observations is attributed to Kevin Dye.
7. Action. The Law Requisite Action predicts that any action plan to reform complex social systems designed without the authentic and true engagement of those whose futures will be influenced by the change are bound to fail. The Law of Requisite Action is attributed to Yiannis Laouris.

A central tenant of the theory is that dialogue managers (also known as design managers or as process facilitators) do not inject their views into the content of the community design as it is produced by a structured dialogue in the arena of practice.

METHODOLOGY

Methodologies apply the laws of a science in fashions that assure logical integrity and completeness. Dialogic design science applies the laws of the science in a methodology that guides such activities as stakeholder selection, framing of triggering questions, performance of the design management team roles, and even into publication or performance of understandings assembled by the community of stakeholders. Over the course of the evolution of the dialogic design science, an early methodology known as Interactive Management (see reviews by Warfield, 1994; Alexander, 2001) was complemented by a computer software which was called the CogniSystem® (Christakis, 1996) and has become broadly cited in the literature as the CogniScope® methodology (see Christakis and Bausch, 2006). This methodology was customized within the arena by the Americans for Indian Opportunities and called the Indigenous Leaders Interactive System (ILIS™) (Harris & Wasilewski, 2004). ILIS has been applied to indigenous communities around the world. The most recent evolution of the methodology is called Structured Dialogic Design® (Schreibman, V and Christakis, AN, 2007; Bausch, 2008; Flanagan, 2008; Laouris, Laouri and Christakis, 2008; Laouris et al., 2009; Flanagan and Christakis, 2009), which has emerged in the context of the Institute for the 21st Century Agoras in the USA, and the Future Worlds Center in Cyprus. As the science seeks to reach audiences through the use of the Internet, a methodology called WebScope is being developed in a variety of nonprofit (see Laouris and Christakis, 2007; http://obamavision.wikispaces.com/) and corporate (e.g., Dialogic Design International) settings.

APPLICATIONS

Variations of the generic Methodology of the science are used with communities in specific applications. The communities can be corporate or civic, religious or secular, local or international, etc. Such applications of the science typically allow a measure of flexibility to accommodate conditions unique to different communities; however, each application does have its limitations, and use of methodology beyond the validated context of the science as described by the DOSM in Figure 1, constitutes an experimental application of the science. The inference is that in experimental applications, limitations of the methodologies may cause failures, which can subsequently contribute to challenges of the axioms of the science for evolutionary adjustments in the foundation domain. This is, of course, an issue of central concern to the field because while the Corpus exists to enable and to complement the Arena, uninformed application of the Methodology of the science compromises the integrity of the community to advance the science in concert.

CREATING AN INFERENCE MAP OF THE PRINCIPAL "COMPONENT CONCEPTS" OF DIALOGIC DESIGN SCIENCE

While the Warfield DOS Model is elegant in its generic simplicity, it doesn't capture significant components of the interplay of basic and applied science in a systems view. This is to say that the model has heuristic value in understanding the science, but lacks power for guiding the evolution of the science. Where, for example, might limited resources be invested to maximize the advance of the science? To approach this question, Interpretive Structural Modeling was employed to map supportive inferences among thirteen principal components of dialogic design science. The selected components were chosen by the authors of this paper and corroborated through extended online discussions by a community of theoreticians and practitioners of the science based in North America, Mexico, Europe, Africa and Australia (see http://dialogicdesignscience.wikispaces.com/).

TABLE 1. The principal components of dialogic design science used for exploring the supportive inference relationship as aligned with the DOSM typology. The numbers in parenthesis indicate the number of sub-components:

1. Foundation Domain:
- Component 1: Axioms (6)
- Component 2: Definitions (7)

2. Theory Domain:
- Component 3: Laws (7)
- Component 4: Action Tree
- Component 5: Erroneous Priorities Effect
- Component 6: Role Distinctions (Context, Content, Process)
- Component 7: Situational Complexity

3. Methodology Domain:
- Component 8: Consensus Methods (7)
- Component 9: Language Patterns (Archanesian Geometry)
- Component 10: Phases (Discovery, Design, Action)
- Component 11: Dialogue Stages (Definition/Anticipation, Designing, Decision, Action Planning)
- Component 14: Design Management Team Roles

4. Applications Domain:
- Component 12: Co-laboratory F2F
- Component 13: Co-laboratory Virtual

The thirteen components were structured using the generic question: "*Will consideration of component X, significantly support the inference of component Y, in the context of the DOSM typology?*" In the narrative interpretation of the Interpretive Structural Model shown in Figure 2, we will interpret the "support the inference" relationship among the components as an "influence" relationship.

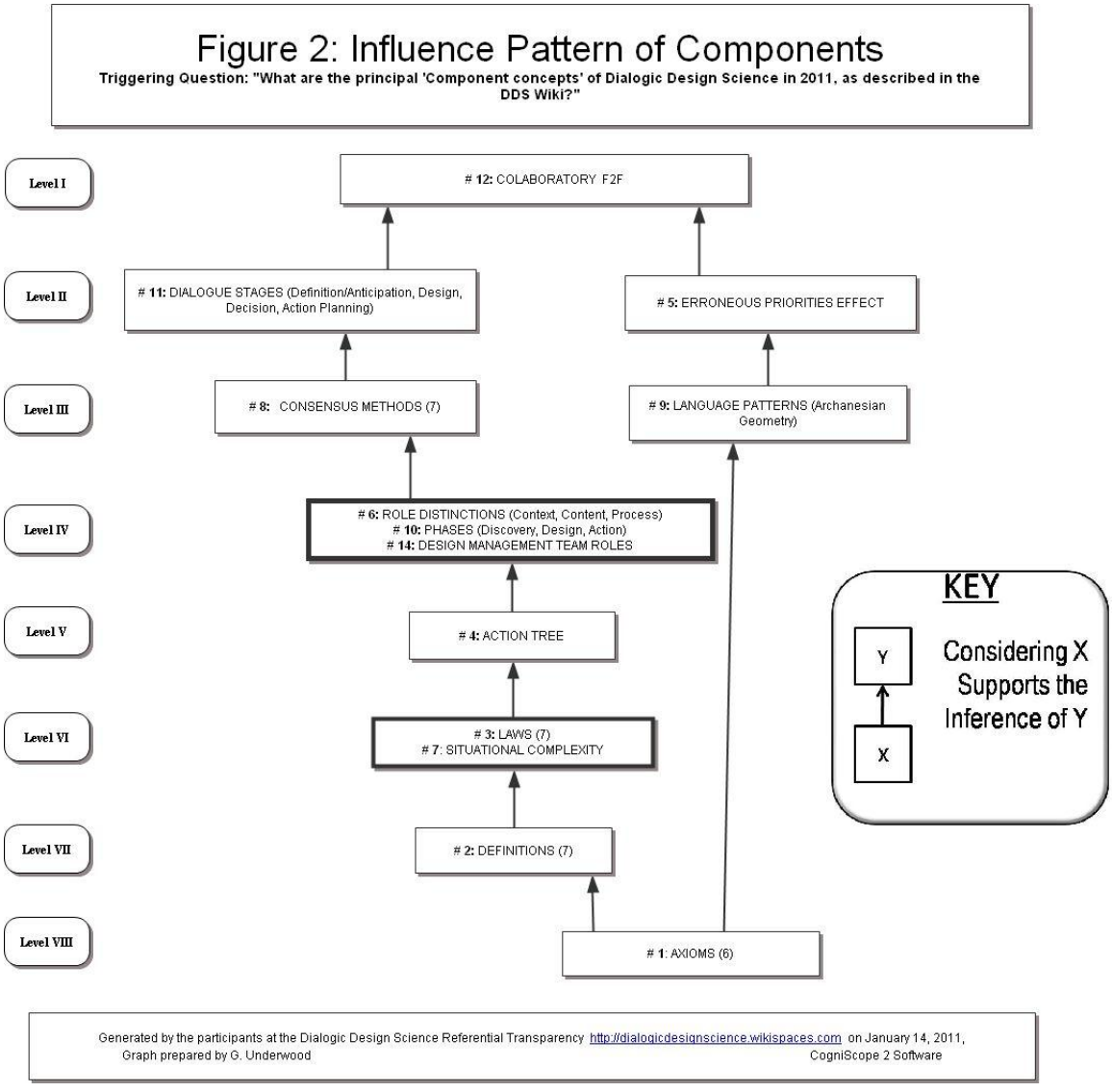

Figure 2: Influence map of thirteen principal "component concepts" of dialogic design science.

NARRATIVE INTERPRETATION OF THE INFLUENCE MAP

Interpretive Structural Model (ISM) maps are typically read from the "deep driver" of system influence, which is located at the base of the structure (Level VIII of Figure 2). Influence propagates upward along the pathways of the arrows. The current work identifies understanding the Axioms (Component 1) as the most highly influential

understanding impacting the overall transfer of meaning across the components of the field of dialogic design science. This component directly enhances understanding of the Definitions (component 2) and Language Patterns of dialogic design (Archanesian Geometry; component 9). Components 1 and 2, the Axioms and the Definitions, respectively, belonging to the Foundation Domain of the DOSM, are the drivers at Levels VII and VIII of the ISM map. This of course makes sense where the corpus of a science is required to lead to strategies and tactics for testing the science in the arena.

Two walks start from the Axioms component at Level VIII. The walk on the right supports the inference of "Component 9: Language Patterns" directly, which in turn supports the inference of "Component 5: Erroneous Priorities Effect," both of which belong to the Theory Domain of the DOSM.

The walk on the left enters the Theory Domain by supporting the inference of "Component 3: The Laws" of the science, which is in a cycle with "Component 7: The Situational Complexity." The Laws contribute to measuring the Situational Complexity Index, which in turn supports the inference of the Laws of the science of dialogic design – a science conceived specifically for application in complex situations. The implication of the cycle containing these two components is that the science of dialogic design would not have emerged if we did not encounter the escalation of situational complexity in the Agoras of the Global village.

The ISM map displays an overlap between the Methodology Domain, represented at Level III and II by "Component 8: Consensus Methods" and "Component 11: Dialogue Stages." The overlap occurs because the cycle containing three Components, namely 6, 10, and 14 at Level IV, supports the inference of the Consensus Methods component in this current analysis.

Finally, at Level I, we only have the Co-Laboratory component (#12), which belongs to the Applications Domain of the DOSM. This component is supported by all the other components of the dialogic design science, and in turn feeds back in the Foundation Domain of the DOSM and ensures that the Foundation, Theory, and Methodology of the science are validated in the arena. This feedback is not shown in the ISM but it can be inferred from the DOSM.

DISCUSSION

The intent of this brief study is two fold: first to reintroduce the DOSM created by John Warfield, and second, to illustrate its applicability for understanding referential transparency in the evolution of dialogic design science. In fields of conceptual science, such as dialogic design, where experiments cannot be conducted in laboratories but must be conducted in co-laboratories in the arena with stakeholder engagements, strong reliance is placed upon rigorous use of well defined and thoroughly validated methodology. Only when confidence can be placed in appropriate use of methodology will evidence-based arguments be compelling enough to guide the evolution of the

science. Modifying (or "tinkering" with) a methodology without a deep understanding of the theory behind validated methodology can destabilize a science. On the other hand, the science can only advance by hearing and understanding experiences from within the arena. Thus, there is an essential communalism between basic and applied science in fields such as dialogic design science. The Interpretive Structure Model of the components of the dialogic design science underscores the importance of practitioner awareness of axioms, definitions, and laws, from the Corpus to guide their assignment of consensus methods, roles, and phases of engagement with communities in the Arena. The recommendation from this study is that all dialogic design science practitioners should challenge themselves to be serious students of the theory, and all theoreticians should challenge themselves to be compassionate learners from the practice, so that the exchange of essential knowledge can be optimized for the greater benefit of the science and the communities of stakeholders that the science serves.

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