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Abstract

This paper addresses a type of wicked problem in the design of information systems in the context of G2G e-Government information systems. These problems, called power issues, have all of the characteristics of wicked problems; however, they are differentiated from them because their roots are based in power. The Power Perspectives Framework from Bradshaw-Camball and Murray is utilized in the context of these G2G systems to provide a framework for the identification and classification of power issues and Courtney's DSS paradigm is extended to assist in resolving them by incorporating the power perspective into the methodology.

Keywords: power, information systems, wicked problems, e-government

Introduction

Every designer of inter-organizational information systems in the business environment will have to address various issues throughout the design process. Some of these issues are particularly difficult in that defining the problem actually is the problem. These issues have been deemed "wicked" problems because they have ill-defined requirements and are particularly daunting to the designer of information systems (Gorry and Morton, 1971; Rittel and Webber, 1973). These wicked problems have been well studied in the information systems literature and there exist several methodologies for dealing with them (Courtney, 2001; Markus, Majchrzak et al., 2002; Hevner, March et al., 2004).

To the designer of inter-organizational information systems, wicked problems seem to be commonplace (Rittel and Webber, 1973; Coyne, 2005). Many times, a contributing factor to the development of these problems is related to power. Power can be related to the differing goals of the organizations involved (Hart and Saunders, 1997) or it can be related to the increased number of actors involved in the process (Knights and Murray, 1994), or for a myriad of other reasons. The preponderance of the research of the role of power in information systems seems to be in the realm of organizations in the private sector (see Jasperson, et al., 2002). While power certainly plays a key role in the development process of private sector inter-organizational information systems, this paper argues that it is especially important in the development of inter-organizational information systems such as those between governmental entities.

Inter-organizational information systems are subject to power struggles and politicking (Homburg, 2000). However, the designer of e-Government information systems is faced with issues involving power that are unique to their environment. One of these unique issues is the desire of Governmental entities to utilize inter-organizational information systems to gain or maintain bureaucratic power (Peled, 2000). This desire to maintain power sometimes leads the designers of these systems to make them deliberately incompatible with other governmental entities (Peled, 2000). The issues that arise from this activity are a specific type of wicked problem called power issues because, as opposed to the traditional wicked problems, their etiology can be traced back to the various perspectives of power.

This paper will seek to identify and classify power issues through an application of the sociological power perspectives framework developed by Bradshaw-Camball and Murray (1991). The application of this framework will serve as the basis for taxonomy of power issues in G2G e-Goverment information systems. An extension of Courtney's Decision Support System (DSS) model (2001) will be presented as a methodology for dealing with power issues. This model, based on Churchman's Singerian Inquiring System (Churchman, 1971) and Mitroff and

Linstone's (1993) Unbounded Systems Thinking (UST), uses a multiple perspective approach to provide a solution to wicked problems.

This paper begins by providing an overview of wicked problems and power issues. Next, the sociological power perspective framework of Bradshaw-Camball and Murray is presented and an explanation is provided on how each of these perspectives relates to power issues in inter-governmental information systems design. Courtney's DSS paradigm is then discussed and extended to be more amenable to the resolution of power issues.

Wicked Problems and Power Issues

Unstructured or wicked problems are problems that are classified by ill-defined requirements that do not lend themselves to the rational processes of science and engineering (Gorry and Morton, 1971; Rittel and Webber, 1973; Mitroff and Linstone, 1993)). In fact, defining the problem *is* the problem in most cases. Rittel and Webber (1973) describe wicked problems as having ten distinct characteristics. Some of these characteristics are the lack of a stopping rule and the fact that every wicked problem is unique. For a listing of all the characteristics of wicked problems see Rittel and Webber (1973). It is certainly no surprise why wicked problems are of interest to information systems researchers, as wicked problems such as these are prevalent in all types of information systems (Rittel and Webber, 1973; Coyne, 2005). The focus of this paper is are problems that have all of the characteristics of wicked problems, but have their origins in the differing perspectives in the struggle for power between organizations involved in the design of shared information systems.

Power Issues

One of the main goals for participating organizations in the development of inter-organizational and G2G e-Government information systems is twofold. They want to (1) reduce their dependence on other organizations while (2) making those other organizations more dependent on them (Reekers and Smithson, 1996; Homburg, 2000). One way that organizations can attain these goals is through the use of power and the wicked problems that arise as a result of having power as a goal of an information systems design are thus named power issues.

These power issues, although present in all inter-organizational information systems development projects, seem to be especially present in e-Government systems. A major reason for their prevalence in G2G information systems is that the agency that houses the data (or the majority of the data) for the system is seen to have increased power, while the agency(s) that have to retrieve data from the remote system are seen as losing power (Peled, 2000). Another reason is that participation in inter-organizational information systems in the private sector is almost always done on a voluntary basis, whereas participation in G2G information systems can be mandated by legislation. An example of this is the Family Support Act of 1988 which required states to have a single system for the collection of support payments.

In order to identify and classify power issues in G2G e-Government projects, the sociological power perspectives framework developed by Bradshaw-Camball and Murray (1991) is utilized in the context of information systems design to categorize the different perspectives of power in information systems. They classify power in one of four perspectives: rational, pluralist, interpretive, or radical.

Rational Perspective

The rational perspective represents decisions that are based on legitimate legal authority and logic. In the context of power issues, these are design issues where legislation or authority has entered into the design process and has a part in setting system requirements, implementation timetables, etc. Expertise also leads to rational power. So, an agency that had the technology staff to design and administer a G2G information system would have significant rational power over an agency that did not. According to Peled (2000) this would at least gain the organization some "effective" power because they had the advanced professional staff required to perform the task.

Pluralist Perspective

The pluralist perspective of power is based on who can influence others due to their having access to resources and information. This perspective is based on the fact that the participants will have separate goals that will often be in conflict with one another. Homberg (2000, pg. 4) exemplifies these conflicting goals in G2G information systems when he writes,, "According to political organization theory, each organization strives to optimize its self interest by (1) minimizing their dependence on other organizations and (2) maximizing the dependence of other organizations on themselves". Political battles over who will control the resources of the information system can also be classified under this perspective.

Interpretive Power

Interpretive power is based on the ability to control the meaning of what others experience through the control of the construction of a social reality. This is done through the manipulation of perceptions, meanings, and symbolism. Interpretive power is gained or lost in G2G information systems design through the control of the symbolic components of the information systems such as data dictionaries, choice of software front-end, user interface, etc.

Radical Power

Radical power involves maintaining or undermining existing power structures in a broad social context. Usually it is an outgrowth of social structures such as class, race, gender or institutional structures. An example of radical power in G2G information systems is when the systems are deliberately designed to be incompatible for the purpose of maintaining bureaucratic or political power (Peled, 2000).

In a G2G information system design scenario, an examination of the participating agencies using this framework will help to identify potential power issues that may come up in the design process and allow the system designers to plan for the pitfalls that they may pose. This examination is performed by evaluating each of the participating agencies against each other using the power perspectives framework and looking for situations where there is parity in the different perspectives between the agencies. This parity could be indicative of actual or potential power issues. For example, two agencies with similar resources may have issues when it comes to deciding which agency will host the system.

The Courtney DSS Paradigm

In 2001,, Courtney argued that as organizations became more complex and interconnected their problems would also become decidedly more wicked. Because traditional DSS methods had rarely viewed problems from perspectives other than the technical, Courtney called for a new DSS paradigm that would incorporate Mitroff and Linstone's (1993) Unbounded Systems Thinking (UST), and Churchman's (1971) Singerian Inquiring System. Mitroff and Linstone (1993) state "All complex problems — especially social ones— involve a multiplicity of actors, various scientific/technical disciplines, and various organizations and diverse individuals. In principle, each sees a problem differently and thus generates a distinct perspective on it". The perspectives that eventually are considered in UST are the Technical (T) perspective, the Organizational and Social (O) perspective, the Personal and Individual perspective (P), the Ethical (E) perspective, and the Aesthetic (T) perspective.

Churchman's Singerian Inquirer is based on two premises. The first is that a measurement system is established to resolve disputes among members of the community. The degree to which this system can resolve disagreements between community members is the performance measure of the system. The system must also be able to replicate its results to ensure consistency. The second principle involves the "sweeping in" of variables when models fail to explain phenomena. Concepts from various areas are incorporated into the measuring system's image of the phenomena to overcome inconsistencies. Churchman (1971, pg. 198) writes that "human knowledge does not come in pieces: to understand an aspect of nature is to see it through "all" the ways of imagery." Courtney uses these principles as the theoretical foundation for his DSS model.

At the center of Courtney's paradigm are mental models. The mental model examines what data and perspectives should be examined and influences (and is influenced by) every step in the process (Courtney, 2001). The process begins with the recognition of the existence of a problem. However, unlike most DSS models, Courtney's process

does not immediately begin creating alternative models. Instead a process is undertaken which collects all of the perspectives of the varying stakeholders in the situation. Courtney (2001, pg. 31) writes, "The various perspectives provide much greater insight into the nature of the problem and its possible solutions than the heavy reliance on the technical perspective that DSS has advocated in the past.". He also advocates the use of cognitive maps, entity-relationship diagrams, and other techniques to help demonstrate the interconnectedness of the problem elements (Courtney, 2001). It will also help to surface some of the underlying assumptions about wicked problems that the various participants have (Courtney, 2001). After the perspectives are collected, they are then synthesized to provide the basis of the alternative models of which one will be chosen for action.

The DSS Paradigm and Power Issues in G2G Information Systems

In earlier sections, power issues were identified and classified using the Bradshaw-Camball and Murray framework. The final step in the process is to provide a means to help with the resolution of power issues. In order to do this, Courtney's DSS paradigm is amended to explicitly consider the power issue perspectives as a part of its perspectival collection and synthesis. After doing this, the DSS paradigm would become the one featured in Figure 1.

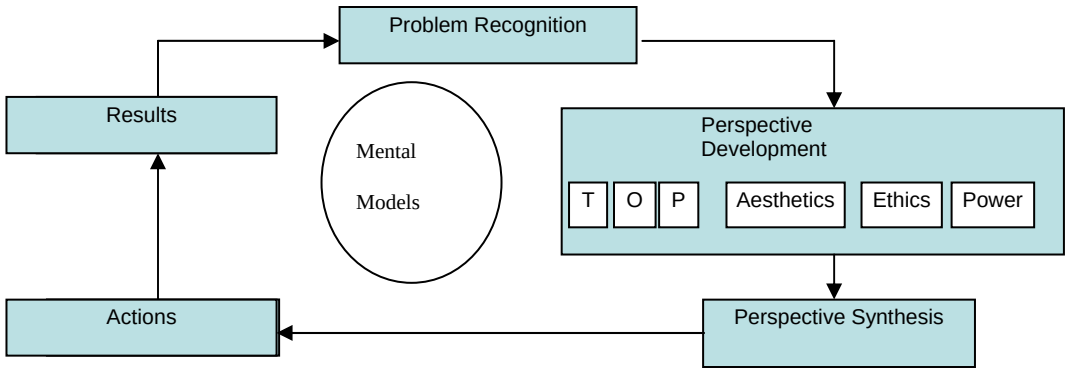

Figure 1. An extension of Courtney's DSS framework to support power issues (adapted from Courtney, 2001)

The power perspective can be added to the perspective development stage of the DSS paradigm by evaluating each of the participating agencies against each other using the power perspectives framework discussed earlier in the paper, and by looking for situations where there is parity between agencies in the different perspectives. These parities could be indicative of actual or potential power issues.

By capturing the power perspectives using the power perspectives framework and incorporating it into the Courtney DSS paradigm, this paper argues that the DSS paradigm becomes more effective when dealing with power issues like those found in G2G information systems. This is because power is explicitly addressed in the perspective development, which will lead to a more effective synthesis of the perspectives in the following phase of the DSS framework.

Conclusions

The purpose of this paper is to identify a specific class of wicked problem in information systems desig, and, more specifically, in the design of G2G e-Government systems. These issues have all of the characteristics of wicked problems, but find their roots in power struggles between organizations. The Bradshaw-Camball and Murray framework was utilized to assist in identifying and classifying these power issues. This framework provides four groups to classify the power issues. An examination of the participant organizations against this framework will help the designers to identify potential power problems so that they can address them early in the design process. Finally, a DSS paradigm that is built on Churchman's Singerian Inquiring System (1971) and the Unbounded Systems Thinking of Mitroff and Linstone (1993) was extended to incorporate the power perspectives into its perspective collection and synthesis process in order to help with the resolution of issues of this type.

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