

Information System Development: A Categorical Analysis of User Participation Approaches

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User participation is generally considered an important aspect of information systems development and a leading factor in systems success. However, results from earlier studies are inconsistent as to the significance of user involvement to system success, and suggest that perhaps new avenues need to be explored [6,12,15]. In this study, we extend the line of inquiry on user participation by extending the descriptive model of Cavaye [6] and including ideas from the complementary but separate social process model of Newman and Robey [21]. The result is a user participation approach (UPA) framework encompassing four worldviews that emerge from the four paradigms proposed by Hirschheim and Klein [10]. Thus, the UPA framework uses meta-theoretical assumptions to describe and explain the user participation process from a new angle. This framework can be adapted and customized to fit the needs of specific organizations and thereby facilitate more successful systems development.

1. Introduction

One of the reasons new information systems projects have had such a poor success rate may be related to the way some analysts view organizations and their members [2]. These different worldviews, categorized as functionalism, radical structuralism, social relativism, and neo-humanism are both explicitly and implicitly imbedded in the design methodology or approach which guides the information system development (ISD) process [10]. User participation is generally assumed to be a critical factor in successfully developing an information system (IS). Interestingly enough, empirical studies have been unable to conclusively prove a link between user participation and system success. Indeed, attempts to organize and synthesize past empirical studies on user participation have resulted in conflicting results [6,12,22]. Thus, the IS literature seems to indicate that there is no guarantee that user participation leads to a successful information systems project.

Numerous researchers have done empirical research on the importance of user participation and

its relationship to system success [6,8,12,14-16] and others have examined the social process of user participation [21,24] and cultural impact [4,14] of user involvement. Still other researchers have examined how the backgrounds and perspectives (worldview) of users and analysts affect their relationships, but these studies generally focused on specific aspects, such as conflict during the user-analyst interaction [23,25]. There are various aspects to studying user participation, and one promising approach is looking at the context within which user participation can result in improved user satisfaction. This approach seeks to explain where and how user participation should occur and find strategies based on the results for the most appropriate involvement for users during system development [20]. Another interesting approach is to capture the institutional and development-related contexts that shape and influence the processes of user participation and the management of change [5]. It is not surprising, due to the dynamic nature of organizations[7], that user participation approaches remain a highly complex and diversified topic of research and practice in ISD.

The intent of this paper is to extend the line of inquiry by providing IS researchers and IS practitioners with a framework encompassing four approaches to the user participation process in ISD that emerge from the different worldviews that exist within organizations [10] [14]. These four information systems development approaches (ISDAs) include the traditional approach (based on functionalism), and three alternative approaches based on different worldviews [13]. The proposed framework will nurture a more systematic and complete account of the user participation process by synthesizing and extending an existing descriptive model [6,21] and the complementary but separate social process model [21].

The framework is developed to gain insight into the user participation process. Based on a detailed categorical analysis of the user participation process, the paper shows:

- that although there is a traditional approach (functionalism) to user participation in ISD, there are newly developed alternatives that

are based on different worldviews (i.e. radical structuralism, social relativism, and neohumanism).

- that these worldviews are either explicitly or implicitly behind the decision to adopt a particular user participation approach (UPA)
- that the UPA adopted is directly related to the way in which participatory activities are prioritized; thus, it is an ISD tool
- a particular UPA results in important social and psychological outcomes.

This paper is organized as follows. After a short overview of user engagement, the user participation process, and the four ISDAs that are derived from the four paradigms, we develop a UPA framework and justify its use as a means to better understand the user participation process. Based on a survey of the literature, we summarize a categorization of user participation approaches using the UPA framework. The paper concludes by illustrating how the proposed framework can be applied adaptively, and customized to fit the needs of an organization. In addition, suggestions to improve the user participation process are made, and new avenues for UPA factor and process research are put forward.

2. Background: The concept of user engagement

User participation has been discussed in the literature from many theoretical perspectives. Attempts to organize and synthesize the literature have proven difficult. In ISD the user participation process has numerous ambiguous terms that need to be defined. First, Barki and Hartwick [1] suggest that the term user participation should be used “when referring to the set of operations and activities in the systems development process, and the term user involvement “should be used to refer to a subjective psychological state which influences user perceptions of the system.

Development-related activities performed by users during ISD include activities that may pertain to either the management of the ISD project or to the analysis, design, and implementation of the system itself [6]. Therefore, participation reflects what specific behaviors are performed, how many of these behaviors are performed, and how often they are performed and can be measured by asking users to indicate the extent to which they have performed specific assignments, activities, and behaviors [9].

Due to the diverse use of the terms user participation and user involvement, user engagement has emerged as a term that refers to either user participation or user involvement or both [12]. In

addition, recent research also looks at user attitudes as a separate term and defines it as affective or evaluative judgment (e.g., good or bad) towards an object or behavior [1]. Simply said, it is a psychological state that reflects the user’s feelings about IS. This is important because recent research has suggested that user participation, user involvement, and user attitude exert different impacts on system outcomes. Indeed, a circular relationship is suggested [16], because when user’s perform participatory activities, they can help users get more involved, which may improve the user’s attitude and make them feel more satisfied with the IS.

2.1 Information systems development research models

Research models are attempts to capture and explain the complex, interdependent, and dynamic factors and processes that exist in our world. Mackenzie [19] presents a process approach for the organization sciences that views organizational behavior as fundamentally a physical process, thus it is a sustained phenomenon or one marked by gradual changes through a series of states. This supports earlier conclusions that user participation is inherently a process [6,21]. Indeed, it is part of a larger ISD process that is characterized by its dynamic nature [21]. As we look at factor and process research it is important to note that variables are often a form of the outcomes (results) that come from a process and are inherently causal [19]. However, a variable cannot capture the complexity of a process that takes place because a process represents a developmental sequence of events. Factor and process models do not produce the same causal arguments. Interestingly enough, factor research models are the most commonly used models in ISD [21], and although they are useful to researchers, a gap exists in the study of the actual processes that produce the factors. Past research [6,21] suggests that process and factor models complement each other, and when presented together, give a more informative and therefore more complete picture of what is being studied.

The factor research component captures the potential predictors of successful ISD and tests the empirical relationships between predictors (variables) and outcomes (variables). For example, earlier empirical studies on user participation have had mixed results on a link between user participation (variable) and system success (variables) [6,12,15,16]. Variables are designed to be measured and therefore explain very little of the variance that naturally occurs when predicting an outcome [15,26].

Furthermore, factor research approaches do not explain how outcomes occur.

A complement to the factor research component is the process research component. It holds the promise of providing new insight into old concepts by allowing researchers a view of the many theoretical perspectives and topic areas in a simplified, but more complete model. A process approach describes, explains, predicts, and can be used to alter behavior. It is dynamic and provides the story that explains the strengths of the relationships between predictors and system outcomes.

Briefly, there are a few basic ideas behind processes [19] and therefore behind the user participation process. First, events take place in all processes. Second, a time-dependent sequence of these events occurs. Third, this sequence will involve distinct components (e.g., people, the steps or stages, relationships between steps, links to other processes). Fourth, the outcome of a process is determined by the process itself.

3. A UPA framework for the user participation process during information system development

Adapted from Cavaye [6], Figure 1 depicts the traditional variables in the factor research component that have been used in previous user participation research, but extends the model by synthesizing numerous other ideas put forward in the literature, including the four paradigms of information systems proposed by Hirschheim and Klein [10]. This framework is designed to present a more complete picture of a complex phenomenon that is frequently marked by gradual changes through a series of states. In addition, this extension will help organize existing research findings and continue the cumulative research tradition on user participation.

The UPA framework recognizes contingencies, which refer to the variables that enable or inhibit user participation. Intervening mechanisms are included to illustrate that the system outcome may have variables that moderate the user participation effect [6]. It is important to recognize them, so that the user participation process is viewed in the context of the larger picture.

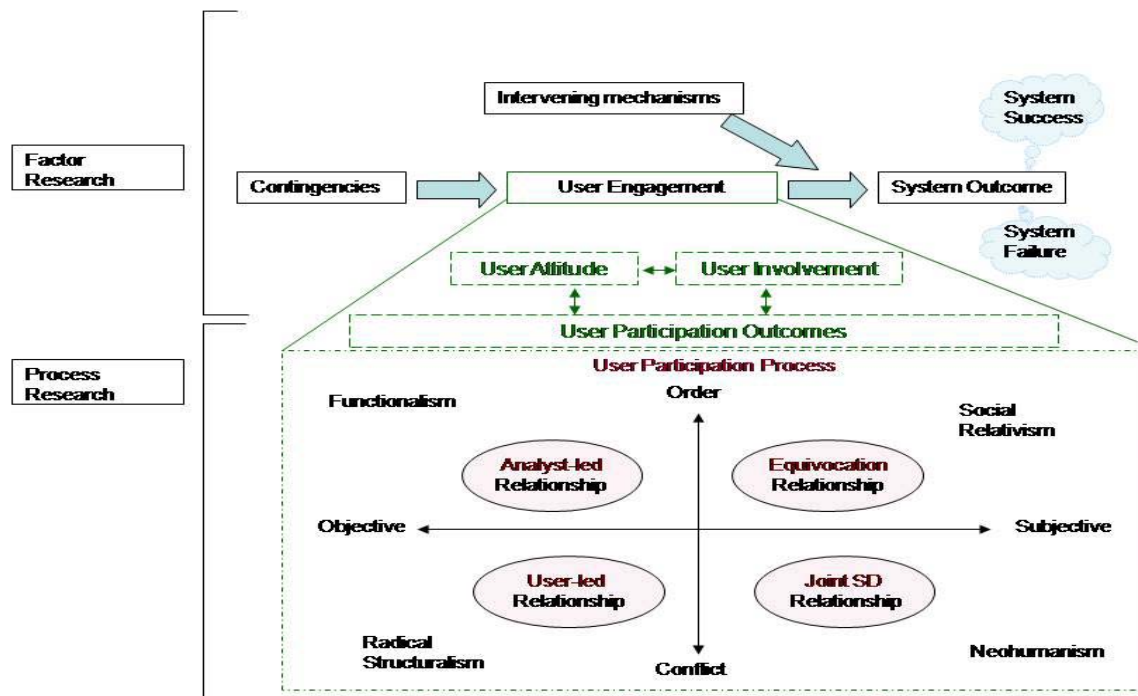


Figure 1. User participation approach (UPA) framework

3.1 A worldview of user participation

Burrell and Morgan [3] use epistemological assumptions (how you obtain knowledge) and ontological assumptions (your social and technical worldview) to yield two dimensions: a subjectivist-objectivist dimension and an order-conflict dimension. The subjectivist position seeks to understand the basis of human life by exploring the depths of the subjective experience of individuals.

The main concern is with understanding the way in which an individual creates, modifies, and interprets the world. The objectivist position applies models and methods resulting from the natural sciences to the study of human affairs. The objectivist thinks of the social world as being the same as the natural world [3]. The order-conflict dimension is described as where an order or integrationist worldview emphasizes a social world characterized by order, stability, integration, consensus, and functional coordination. The conflict or coercion worldview emphasizes change, conflict, disintegration, and coercion [3]. The dimensions are offered as a theoretical schema for analyzing organizational theory.

Following Burrell and Morgan [3], Hirschheim and Klein [10] map the dimensions onto one another to yield the four paradigms of information systems. These four paradigms are sets of assumptions about ISD which reflect different worldviews about the physical and social world [10,11]. Different worldviews tend to be reflected in different theories. Indeed, all approaches are located in a frame of reference (worldview) of one kind or another. In 2001, Iivari, Hirschheim and Klein [13] extended this line of research by supplying a four-tiered framework for classifying and understanding ISD approaches and methodologies that have been proposed in the literature. The UPA framework proposed in this paper is a frame of reference for the user participation process in ISD. This provides a comprehensive schema for analysis of user participation outcomes (issues and problems) within ISD and in particular, the user participation domain.

In summary, the four paradigms (see Table 1) are used as the foundation for this research because they are grounded in the literature. They encapsulate the main assumptions of the traditional and some alternative approaches to ISD in a simplified, yet useful way.

Table 1. User participation and information systems development paradigms [10]

<p>Functionalism (objective-order)</p> <ul style="list-style-type: none"> • Traditional, problem-oriented approach [3] to user participation • Provides explanations of the status quo, social order, stability, consensus, need satisfaction, rational explanation [3,10,11] • Existing power structure (tends to be top down) is reflected in the user participation process [11] • Effective social regulation and control (directed by management, analyst-led) [3,11,21] 	<p>Social Relativism (subjective-order)</p> <ul style="list-style-type: none"> • Alternative, emergent approach to user participation • Social world is emergent social process that seeks explanation within the realm of subjective experience [3,11] • Frame of reference is individual interpretation of shared meaning [3] • Postponing or eliminating any particular type of leadership from occurring allows social regulation and control to emerge from group interaction (equivocation) [11,21]
<p>Radical Structuralism (objective-conflict)</p> <ul style="list-style-type: none"> • Alternative, reversed approach to user participation • Emphasizes the reversal of existing social and organizational arrangements [11] • It focuses primarily on the structure and analysis of economic power relationships [11] • Allows social regulation and control by the workforce (user-led) [3,21] 	<p>Neohumanism (subjective-conflict)</p> <ul style="list-style-type: none"> • Alternative, balanced approach to user participation • Frame of reference is commitment to transcending current limitations [3] • Seeks radical change, emancipation, by different social and organizational forces [11] • Remove barriers to emancipation- balance between controls and freedoms (joint system development) [3,21]

3.2 A social process of user participation

This research treats ISD as a technical phenomenon embedded in a social process. In particular, the user participation process is a sequence of time-dependent participatory activities (events) that occur. It involves distinct social and technical components (e.g., people, the steps or stages, relationships between steps, links to other processes) that are determined by the user participation process itself.

This social process is an iterative “sense making” process that emerges from a previous understanding of the world. Indeed, this worldview is used to negotiate relationships among stakeholders, managers, analysts, and users during the user participation process. The general form of a worldview is discussed in the terms of Newman and Robey’s social process model [21]. The user participation process is viewed as a sequence of participatory activities (meta-theoretical constructs) that are classified as either an episode or encounter. Episodes are a set of participatory activities. Encounters separate episodes and happen between users, management, stakeholders and analysts. It is important to note that encounters mark the beginning and end of episodes. Within this context, Newman and Robey [21] characterized four types of social relationships in the ISD project.

The user participation process is particularly affected by the agreed on (or lack thereof) IS project leadership. Four types of social relations that illustrate the established leadership are demonstrated in the user participation categories: joint system development, analysts led development, user-led development, and a state of equivocation. These relationships are not the only ones that exist, but are meant to represent a category of similar social relationships based on the leadership that is agreed upon. The importance is two-fold: first, these relationships emerge out of the worldviews of the participants in the process and second, these relationships are one of the major influences on the methods that are used in the process. Therefore, where user participation is led by analysts, this social relationship is likely to have emerged from a traditional worldview and the methods that are used will typically share a number of common features that drive interpretations and actions in ISD [13]. In recent research and practice, alternatives have emerged to this traditional approach. Newman and Robey [21] describe joint system development as a relationship that emphasizes that either party can frequently and easily modify an analyst-created proposal and characterize it with the concept of

prototyping. User-led development is described as employing development tools that are user-friendly and therefore empower users to meet their own needs. Lastly, equivocation is described as a state where either party adopts an uncommitted “wait and see” stance and postpones or eliminates any particular type of leadership from occurring. This allows either party to influence the activities and accommodates continuous change. This lack of leadership can cause an uncertain future for an ISD project.

Following Newman and Robey [21], Luna-Reyes, et al. [17] adapt the process model using a practice perspective as a way to take into consideration the objects and languages used in ISD. Their process model describes the dynamic interaction between four main elements: organization, practice, requirements, and functionality. This is important because a practice view of socio-technical change offers practical heuristics to analysts, management, stakeholders and users. Indeed, it supplies an iterative way to handle the data analysis process and its intertwined social relationships.

4. A categorical analysis of user participation using four approaches

4.1 Research method

A categorical analysis of the user participation process is used to analyze the UPAs in the context of the ISDAs. First, we classify and map the list of user participation items into different process model elements. In a similar manner we characterize the methodologies retrieved from the literature. Finally, the format of heuristics is used to investigate how the approaches translate into manager, analyst, and user actions. In this study, this analysis technique helps clarify the story that the UPA tells us. Specifically, a categorical analysis is used to reveal the following aspects in each approach (for a similar approach see [18]).

- (1) The definition of *user participation approach (UPA)* indicates the overarching concept explicitly defined in the approach.
- (2) The definition of *information systems development approach (ISDA)* indicates the worldview concept explicitly defined in the approach.
- (3) The *management rational* indicates which justifications are provided for the use of the approach and specific goals that managers should pursue.

- (4) Users, management, stakeholders and analysts have *encounters*. It is important to note that encounters mark the beginning and end of an episode. They separate episodes.
- (5) *Social Relationships* exemplify the established leadership in the user participation process.
- (6) An *episode* is a set of participatory activities.
- (7) The *heuristics* indicate how the participatory activities and the UPA are related. The four main practice view elements are organization, practice, requirements, and functionality.

4.2 How do the four approaches differ in the user participation process?

Four generalized categories are given that consist of typical classes of behavior that follow from the assumptions of a particular worldview. The worldviews that the ISDAs are derived from are archetypes that represent highly simplified but paramount conceptions.

CATEGORY I: The analyst as the user participation leader

- UPA: User participation as a rational process.
- Worldview: Functionalism (objective-order) focuses mostly on technical change.
- ISDA: Typically these approaches to ISD share a number of common features that drive interpretations and actions. Examples: Structured, information modeling, decision support system, socio-technical design, object-oriented.
- Management rational: The ideal of profit maximization.
- Encounter: Management, the analyst and users.
- Social Relationships: Analyst-led.
- Episode's Guiding Principles: Information systems are developed to support rational organizational operation and effective and efficient project management.
- Heuristic: Tradition methods to handle the participatory activities of responsibility, hands-on, user-IS relationship, and communication activities. This UPA is technical in nature and significantly focused on the requirements element. Functionality, practice, and organizational elements follow in its analyst-led technical to social focus. Significant emphasis on design and requirements model a worldview that turns a

system into a useful tool for management to achieve their goals.

CATEGORY II: The analyst as a facilitator

- UPA: User Participation as a sense making process
- Worldview: Social Relativism (subjective-order) focuses on social interaction.
- ISDA: Interactionist, Soft systems methodology, professional work practice.
- Management rational: None are apparent. As the social worldview is under continuously changing, no particular rational explanations can be provided to 'explain' the user participation state.
- Encounter: Users and the analyst.
- Social Relationships: Equivocation.
- Episode's Guiding Principles: Information systems development creates new meaning.
- Heuristic: Interrogative activities that enable debate amongst concerned parties as a method to handle the participatory activities of responsibility, user-analyst relationship, communication, and hands-on activities. This UPA focuses on social interaction and thus, is significantly focused on the functionality element. Through interaction, objectives emerge and become legitimate by continuously developing or adding functionality to the information system. The technical communicator role, with its increased emphasis on listening to users and advocating their needs and desires, also can be used to increase and enhance communication during the user participation process and reduce the pain of these changes.

CATEGORY III: The user as the user participation manager

- UPA: User participation as a process of empowerment.
- Worldview: Radical Structuralism (objective-conflict) focuses on radical change.
- ISDA: Participation supports democracy at work and quality of work. Example: Trade unionist.
- Management rational: The ideal of an evolution from capitalist market economy to a collectively planned and managed

economy. This evolution empowers users to meet their own needs.

- Encounters: Management and the analyst.
- Social Relationships: User-led.
- Episode's Guiding Principles: Information systems are developed to support managerial control because management is the user.
- Heuristic: User-friendly ISD tools are used to handle the participatory activities of responsibility, user-analyst relationship, communication, and hands-on activities. This UPA focuses on radical changes that allow users to meet their own needs thus, is significantly focused on the practice element. Craftsmanship and productivity are thought to improve when the users' daily practices are enhanced.

CATEGORY IV: The analyst and stakeholders as partners

- UPA: User participation as an equal opportunity process.
- Worldview: Neohumanism (subjective-conflict) focuses on social change.
- ISDA: Models communicative action in organizations. Example: Speech Act-based
- Management rational: The ideal of emancipation. Information systems should lead to freedom from all unwarranted constraints and compulsions (e.g., distorted communication) toward a state of well-being for all.
- Encounters: Stakeholders and the analyst.
- Social Relationships: Joint system development.
- Episode's Guiding Principles: Information systems are developed to remove distorting influences and other barriers.
- Heuristic: Analyst and stakeholders can frequently and easily modify an analyst-created proposal and jointly handle the participatory activities of responsibility user-IS relationship, communication, and hands-on activities. This UPA is social in nature and significantly focused on the organizational element. Practice, functionality, and the requirements elements follow in its social to technical focus. Significant emphasis on organizational design and adaptation should lead to an ideal environment for joint system development. Two examples of techniques that employ the social relationship of this UPA: User

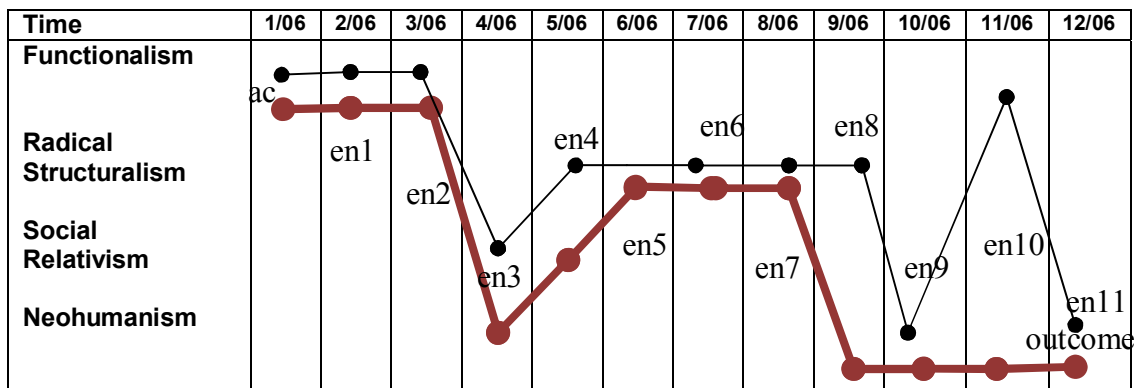
Participation FAST (Facilitated Application Specification Techniques) encourage: the creation of a joint-team of customers and developers. Joint Application Development (JAD), prescribes a series of workshops facilitated by a session leader trained in group dynamic techniques, where users and developers work together.

5. Empirical illustration of the UPA framework

The general form of this illustration represents the user participation process as a sequence of events, classified as either an encounter or episodes that occur over time. The basic theoretical construct is the event and is measured as a sequence of participatory activities, which has a beginning and end. An episode is a set of events that take place in the ISD process. The beginning and end of each episode is separated by the encounters between analysts, users, stakeholders, and management. The UPA framework uses an order-conflict representation and an objective-subjective representation in the user participation process. These representations are an oversimplification, but are still a useful tool for conceptualizing the differences in the worldviews that exist in an organization. More importantly, it provides numerous distinctions that can be used to predict and manage the outcome of the user participation process.

The objective-subjective distinction involves the worldviews that are brought into the user participation process, individually and collectively. This draws attention to key assumptions that help describe and explain the specific actions that comprise episodes and encounters. The worldviews that emerge in the different stages of the ISD process can be used as a guide to the appropriate social relationship and heuristic in the embedded user participation process. An order-conflict distinction involves instances of user participation stability, integration, functional coordination, consensus, change, conflict, disintegration, and coercion [3,10,11,13]. These distinctions are offered as not only a classificatory device, but also as an important tool for negotiating each encounter and the proceeding episode.

The categorical analysis becomes a useful research and practitioner's tool when events are mapped as seen in Figure 2 (for similar approaches see [17,21]). The user participation process is described and explained using the main elements in the research methods section: an ISDA that is derived



Legend:	Project Plan UPA	Actual UPA
encounter (en)	●	●
Episode (ep)	—	—

Figure 2. Mapping the UPA in a social process: A hypothetical example

from a worldview (functionalism, radical structuralism, social relativism, and neohumanism) and the UPA, which marks the beginning and end of the encounters between analysts, users, stakeholders, and management. The goal of the first encounter is to first, develop an acceptable project plan UPA based on the process model elements within the category accepted by the user participation team. After the first episode, encounters mark an opportunity to evaluate the project plan UPA and the actual UPA. The goal at each encounter is to evaluate the status of the process model elements and attempt to achieve congruency between the project plan UPA and the actual UPA. Adaptability is possible at each encounter, as figure 2 reflects. Encounters and episodes can maintain stability or change according to the current worldviews that exist within the organization. The categorical analysis is a tool that describes, explains and gives a method that can be used to alter user participation behavior. A successful user participation outcome can be achieved.

6. Conclusions

In this paper it is suggested that the current structure for guiding user participation are better thought of as general UPAs that organize generic principles into a convenient schema that tells a story. The UPA framework organizes the process, so that the researcher and practitioner can create a

conceptual foundation to work from and the categories can be used by practicing system analysts and users as guiding principles to successful user participation. Indeed, the categorical analysis shows that this organization of the user participation process allows us to pay attention to the generic features, which make up the category rather than allowing extraneous details to detract us and misguide our efforts during the user participation process. In summary, based on a detailed categorical analysis of the user participation process, the article shows:

- that although there is a traditional approach to user participation in ISD, there are alternatives that are based on different worldviews
- that the ISDA adopted is directly related to the way in which leadership of the user participation process can or should be decided
- that a particular UPA results in important social and technical consequences in the user participation process.

These approaches are presented to gain additional insight into the user participation process and to show the logical social process that occurs in UPAs. Traditional and nontraditional possibilities are considered, but this research is not an exhaustive coverage of all possibilities. Indeed, these four generalized categories are given to show typical

classes of behavior that follow from the assumptions of a particular worldview. They are archetypes that represent highly simplified but powerful conceptions. In addition, the paradigmatic influences are illustrated and show that creative solutions would be generated to practical problems in a more conscious and systematic way, if the assumptions were explicitly known and a schema is available that articulates the logical progression of the user participation process based on different assumptions.

Meta-theoretical assumptions are analyzed and categorized. This provides a new way to theorize about the nature, purpose, and practice of the user participation process. In addition, this article contributes to the research and practitioner communities in the following ways: First, documentation of the assumptions underlying the UPA allows analysts and users to become better aware of the assumptions and beliefs that they use in their participatory activities. This benefits practitioners by allowing them to adequately prognosticate and manage the organizational impact of IT investments. Second, a better understanding of the conceptual foundations of their beliefs, including the recognition of other belief alternatives, can lead analysts to seek creative solutions using the strengths of each worldview. In addition, the possibility of change is anticipated at each encounter. It becomes an opportunity to shed fresh insight into the organizational impact of the previous episode and the ways in which the next episode can best be proactively managed to promote the development of an effective, value adding information system. The ability to map the UPA during the ISD project becomes a useful tool to visualize user participation.

Lastly a succinct documentation of worldview assumptions invites assessment that can be critical and enlightening in the user participation process. Indeed, a concise categorical analysis of the user participation process that invites critical assessment by practitioners can be used as a vehicle for change management during ISD. In addition, the categorical analysis offers practical heuristics to analysts, management, stakeholders and users.

Given that each UPA is capable of further development and refinement, there appears to be ample possibility for future research. Obviously, one easy extension would be to expand systems development methodologies to UPA and explore their relationships. The UPAs provide a vehicle for investigating new theories about the nature and purpose of the user participation process.

Future research should continue to explore the behaviors that underlie these worldviews and the UPAs that emerge, focusing upon the social relationships and the methods that can be used to

influence participation's effectiveness. For example, certain types of training to enhance the user participation encounter (e.g. on-line tutorials, lectures, group seminars) or types or timings of communication during the encounters and episodes (e.g. asynchronous communication, face-to-face, informal or formal, traditional meetings or electronic meetings) may be more appropriate or effective in the user participation process than others depending on the worldviews, social relationships and methods employed in the ISD project.

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