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Decision Support for Individuals, Groups, and Organizations: Ethics and Values in the Context of Complex Problem Solving

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Abstract

Although research exists in areas of decision support, behavioral ethics, as well as personal differences and decision making, little is understood about the processes at work at the intersection of these areas. We believe that such research will support developing decision support systems for ethics (DSSE). We lay part of the foundation to support the development of next generation DSS that fill the DSSE need, by focusing on values, cognitive biases, and complex problem solving.

Keywords

Ethics, Values, Perspective, Judgment, Problem Solving, Decision-making, Reasoning, Emotion

Introduction

There is much research about decision support, particularly in the endeavor to use technology to support decision-making in organizations. Behavioral ethics in organizations has been widely studied. There is some research about supporting ethical decision making using technology. Much is known about personal values, judgment, problem solving, decision-making, reasoning, and emotion. However, at the intersection of these domains, little research has been performed. Filling this void is congruent with a call for a new DSS paradigm as well as a need for decision support systems for ethics (DSSE), a need defined by organizational and behavioral ethics researchers. We suggest that by understanding how individuals [that vary in their personal characteristics such as personal values and who have naturally occurring cognitive biases] think and interact as they solve problems, make decisions, and reason - often emotionally - we may be able to support the development of next generation DSS that fill the DSSE need.

Decision support systems have traditionally supported the 1) problem definition, 2) alternative generation, 3) model development, 4) alternative analysis, 5) choice, and 6) choice implementation phases of the DSS decision making cycle. Courtney (2001) suggested a new decision paradigm for DSS (Figure 1) in support of perspective-taking. He adds two perspectives to Mitroff and Linstone's (1993) organizational, personal, and technical perspectives; ethics and aesthetics. Courtney also moves from a classic decision making paradigm model to a cycle that emphasizes synthesis and post

implementation review as well as environment scanning. Implicit in this paradigm is a move toward DSS supporting solving complex problems (Rittel and Webber, 1973). Our discussion argues for supporting perspective taking and dialogue during problem solving among individuals, groups, and organizations, by first understanding how perspectives generate within an individual, and how these individual perspectives are related to personal values and unique personalities.

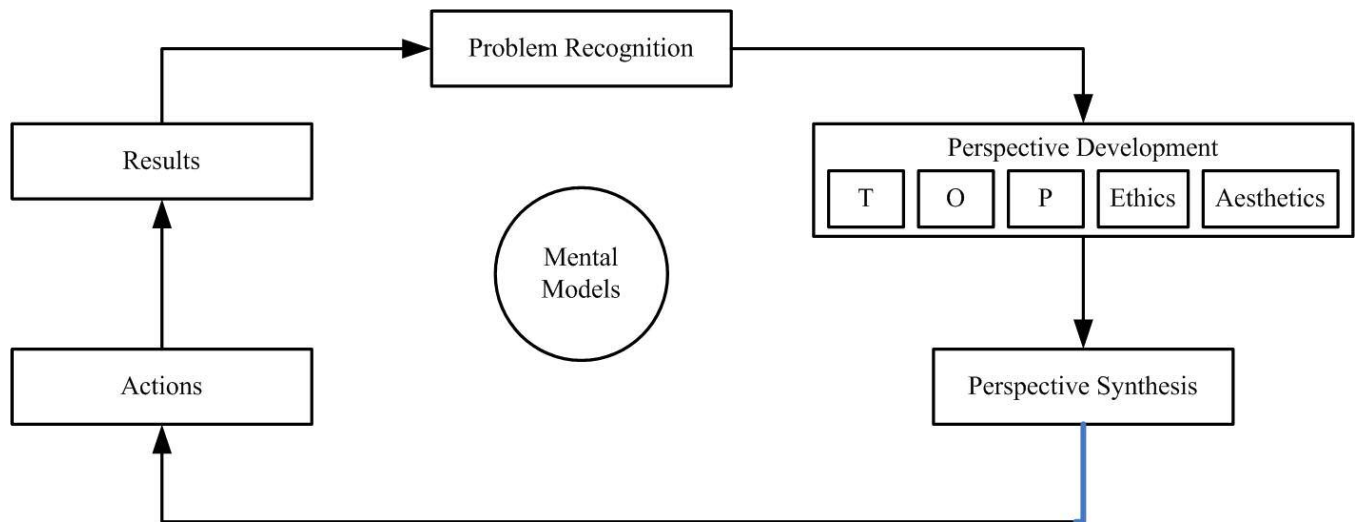


Figure 1: Courtney's new DSS decision paradigm

The need for ethical decision support for organizations is clear; the reader needs look no farther than Enron, Tyco, and the WorldCom scandals. Also, researchers have found moral reasoning is lower when individuals respond to work-related dilemmas than to more general dilemmas (Weber and Wasieleski, 2001). Other researchers have postulated concerns about the ubiquity of moral disengagement (Bandura, 1999) or the use of moral inclusion or exclusion heuristics when considering ethical issues (Opotow, 1990). Bazerman and associates (e.g., 2006) have begun structuring bounded ethicality; ethics applied using cognitive biases. Next we describe what decision support exists for ethics, followed by a discussion of personal values and cognitive processes. If decision aid researchers understand human characteristics such as values, and their relationship with cognitive processes, they will be better able to create effective DSSE.

Ethics and Ethical Decision-making

Ethics is the study of values, rules, and justifications (Solomon and Greene, 1999, p. 1) and is traditionally “that branch of philosophy dealing with values relating to human conduct, with respect to the rightness and wrongness of certain actions and to the goodness and badness of the motives and results of such actions” (Random House, 1989, p. 665). Ethics has been normative and is the study of which actions in a moral dilemma are appropriate. Perspectives include right versus wrong action (i.e., means) (Kant, 1785/1981), good versus bad results (i.e., ends) (Bentham, 1789/1948), virtuous versus vicious character, perhaps leading to right action or good results (Aristotle, 350 BCE/1901), and fairness (Rawls, 1972).

Recently ethics has become descriptive as well as normative (Piaget, 1932/1965). Much work has been done in descriptive ethics models; a full description of extant research is beyond the scope of this paper. However, two important models are relevant to our discussion and are presented next.

Trevino (1986) theorizes ethical decision making to be a combination of individual moderators, moral development stage and situational moderators. This theory explicitly considers cognition and stages of moral judgment, as well other individual and situational moderators. She suggests that individual moderators are ego strength, field independence, and locus of control. Individuals high in ego strength will resist impulses and follow their convictions while those low in ego strength will yield to external pressure. Individuals with a field independent cognitive style will exhibit more consistency between moral judgment and moral action than those with low field independence. Individuals who have an internal locus of control will follow their own convictions more often than individuals with an external locus of control (Trevino, 1986).

Stead et al. (1990) describes ethical behavior to be a combination of individual factors (personality, socialization, etc.), normative ethical philosophy, ethical decision ideology, external forces, past reinforcement, and organizational factors.

Personality factors that are postulated by Stead and colleagues to affect ethical decisions include ego strength, Machiavellianism, and locus of control. Their research also cites social learning theory and suggests that ethical decision making processes may be learned from others important to the person (e.g., significant others, parents, siblings, peers, teachers, etc.) and that past decisions play a role in their current and future decisions. Lastly, the work suggests that organizational factors such as managerial philosophies and behaviors, reinforcement systems, and external forces such as scarce resources, competition, and multiple stakeholders also affect an ethical decision maker's process.

Ethical Decision Support

Ethical decision support systems have been developed. Gotterbarn (2004) created a web-based decision support system to aid in developing a Software Development Impact Statement. This system supports a user identifying the stakeholders in a project, the tasks in a target project, and supports "recording of details and solutions of significant ethical issues" (Gotterbarn 2004, p. 3). Maner (1998) created ICEE (Interactive Computer Ethics Explorer), which leads the user through questions and shares (anonymously) summary information regarding answers from previous participants. Maner (2002) explains ETHOS, an information system that guides a user through a 53-step decision procedure. PETE (Professional Ethics Tutoring Environment) is a web-based virtual tutor that helps a student analyze a case in a guided step-by-step manner (Goldin et al., 2001). Students can move backward and forward in the process and edit previous answers, after comparing their answer with other students. *Agora* provides structure to ethics courses by providing a web-based portal that instructors can use to present cases that are then considered by students (van der Burg and van de Poel, 2005). Students that use *Agora* can work through the different parts of their analyses in any order. *Agora* provides functionality that explains various normative approaches and provides exercises based in these approaches. Sherratt, Rogerson and Fairweather (2005) built a web-based case-based aiding system for ICT and computing students. This system uses a decision tree paradigm for ethical domains, professional duties, and personal moral duties to find similar cases that students can use when analyzing an ethical dilemma.

Robbins et al. (2004) developed and assessed an ethical assistant that supported students identifying and solving problems otherwise not considered, using moral philosophic techniques not otherwise used. Robbins and Wallace (in press) outline how software agents can provide four decision aid roles: advisor, group facilitator, interaction coach, and forecaster. Robbins (2005) presents a computational model of a group of individuals resolving an ethical dilemma, and begins to show the efficacy of using software to mimic ethical problem solving at the individual and group levels. He suggests that such models can serve as engines for DSSE. This paper extends this thought and indicates that if we *understand how people with varying characteristics resolve ethical dilemmas*, we may be able to support people better, by *speaking their language and modeling them more realistically* as we suggest or facilitate the adoption of new perspectives. With this frame of mind, we now discuss personal values, followed by a discussion of cognitive processes that support (or do not support) ethical judgment.

Values

Values represent a standard of behavior that guides action (Rokeach 1973) and have been linked to ethical decision making (Fritzsche, 1995). According to Spranger (1928/1966), there are six types of personal values (dimensions of perspectives) are exhibited by individuals, and that may or may not be held in tandem. Individuals may be *theoretical* and value the discovery of truth and systematic, rational, and scientific ordering of knowledge. They may be *economic* and consider the world in a utilitarian, practical fashion. Individuals may be *political* and value power. They could be *social* and focused upon philanthropic, sympathetic, or humane concerns. People may be *religious* and centered on family and the philosophical or they may be *aesthetic* and seek harmony, be artistic, or view the world from a big picture perspective. A person may exhibit one strong value or exhibit a pattern indicating the importance of multiple values (for instance, a typical business value structure is high on the economic, political, and theoretical dimensions and correspondingly low on the religious, social, and aesthetic ones (Allport et al., 1970)).

Schwartz and Bilsky (1987, 1990) proposed a universal structure of human values that theorizes that some types of values are compatible with each other while other types of values oppose each other and postulated a dimensional space that describes these relationships between values. The values were suggested to be either compatible or contrasting based upon the "motivational concern that the value expresses" (Schwartz and Bilsky, 1990, p. 879). Each of these motivational concerns was developed from three basic human needs: 1) biological needs, 2) interactional requirements for interpersonal coordination, and 3) societal demands for group welfare and survival (Schwartz and Bilsky, 1987, p. 550). For example, they place Rokeach's "a comfortable life," and "pleasure" within the domain that suggests that enjoyment is important, and the Rokeach values "equality" and "helpful" in the motivational domain that focuses upon pro-socialness.

To understand how individual values impact decision-making, studies have been conducted that relate values to ethical decision-making (e.g., Fritzsche, 1995), leadership or management style and ability (e.g., Schnebel, 2000), and group decision-making effectiveness (e.g., Stoddard and Fern, 2002). Research has quantified values into choice models in the marketing arena (Ashok et al., 2002) and to applied individual perspectives to website design (Agosto, 2002). One observation that is evident in these research streams is that individual values are an undeniably related to behavior and that understanding the use of values in individual cognition or behavior is important to understanding decision-making.

Individual values and the value-based perspective associated with them provide a basis for determining appropriate behavior (Meglino and Ravlin, 1998). As a foundation for internalized belief, values are an individual's way of seeking, analyzing, and filtering information. Because they are innate, the effects of a person's values in a particular decision scenario often go unnoticed. It is important that an understanding of values, and their relationship to cognition and behavior, be developed in order that research can move forward toward enhanced ethics decision support, whether technical or non-technical. An understanding of one's own values and those of others can lead to shared interpretation; a necessary outcome for effective decision-making and interpretive learning (Hine and Goul, 1998; Hine et al., 1996).

Shared interpretation requires a method by which individuals agree on a classification scheme for interpretation of the decision context. This type of focus is suggested to increase decision efficacy because of the nature of bringing in and understanding information from multiple perspectives (e.g., Hilmer and Dennis, 2001). Values can provide the foundation for such categorization as well as to process and operationalize beliefs. These cognitive maps (Betttenhausen and Murnighan, 1985) enable organizations to encourage value application, thus positively impacting the decision process (e.g., O'Reilly et al., 1991). One way to categorize individual values, and therefore the maps they create, is to use the work of Eduard Spranger (1928/1966) as a basis for six operational categories of perspective.

Because an individual's perspective is critical and unavoidable in decision situations, we must build systems to help an individual consider multiple perspectives that surface and analyze the assumptions of others, which may promote shared mental models and a broadened organizational perspective. A shared mental model is critical to organizational learning and effective group decision-making, but in order to arrive at that state, the individuals involved must first broaden the scope of their thinking in order to understand the thinking of those around them (Stasser and Stewart, 1992). Further, the broader the range of perspectives and alternatives considered, the more informed the eventual choice (Churchman, 1994). More informed choices are better and more satisfying decisions, all other things being equal (Mennecke and Valacich, 1998).

An organization that has the ability to surface and store multiple value-based perspectives will enhance its ability to solve problems (Swanson, 1999). The ability to surface the dissention created by differing values (and hence value-based perspectives) is necessary for interpretive learning (Hine and Goul, 1998; Hine et al., 1996). Understanding individual values will serve to increase the number of value-based perspectives from which an organization may view, interpret, and act on newly acquired information and to create knowledge (Hall, 2002; Hall and Davis, 2007).

Other non-demographic human characteristics that have been linked to ethical decision making and are purported to affect the ethical problem solving process include cognitive moral development, emotional intelligence, personality, thinking style, knowledge and other beliefs, experiences, and attitudes.

Resolving Complex Problems

Complex problems are ill-defined and unstructured problems often considered and solved by people with varying characteristics (e.g., values, personality, thinking style) and who have predictable cognitive biases. These people are atoms in groups and organizations. Ethical dilemmas are complex problems. Thus, to better support decision aid research in general and ethical decision aid research in particular, it is necessary to understand the interaction of these characteristics which may affect ethical judgment, within the individual and in a social context.

Problem solving includes recognizing or identifying the problem, defining and representing the problem mentally, developing a solution strategy, organizing related knowledge, allocating mental resources to solve the problem, applying a solution strategy, monitoring progress towards a goal, and evaluating a solution for accuracy (Davidson and Sternberg, 2003). In each of the categories above, decisions need to be made. Decision-making in essence is the generation and consideration of alternative choices. In order to generate or consider alternative choices, reasoning is necessary (Newell and Simon, 1972). This in turn creates behavioral interactions with other individuals or groups in organizations.

Another area that is related to problem-solving is emotion. Emotion can be described as the confluence of situational cues, physiological changes, expressive gestures, and a nominative label (Thoits, 1990 in Stets, 2003). Emotion and reason have recently been seen as two separate spectrums (Stets, 2003). For example, as one works towards solving a very difficult problem, one should be thoughtful as well as have strong feelings about being persistent. Strong emotions can affect an individual's thoughts, preventing that person from gathering appropriate information. It has been shown that strong value profiles, in a value-based context (for instance, when considering how or whether to implement a social program), lead a decision-maker to focus on the specific value (e.g., benevolence) rather than the big picture. With proper exposure to the potentially detrimental effect of emotion and reasoning, more careful reflection can be supported (Hall et al., 2003; Hall and Paradise, 2007). We suggest that the resolution of ethical dilemmas is the interaction of several processes, which include problem solving, decision-making, reasoning, emotion, and cognition.

Using cognitive biases to overcome the limitations of cognitive capacity has been one of the prominent streams in Behavioral Decision Theory (BDT) research (Newell and Simon, 1972). More common biases include availability bias, confirmatory bias, and anchoring/adjusting bias (Tversky and Kahneman, 1973). While there is interest in developing debiasing techniques, it appears that cognitive biases are generally very resistant to such techniques (Lehner et al., 1997). In order to overcome the biases that people develop, particularly when those biases are based on deeply held individual values, support systems must be designed to reduce or alleviate the bias effect during a particular decision-making context.

Cognitive bias has been characterized by conflicting results (Vessey and Galletta, 1991). Kydd (1989) addressed the problems of several biases as they related to the use of DSS and considered ways to debias those systems. Her research showed that cognitive biases definitely play a role in how a user searches for and considers information provided by a DSS, but she was unable to debias the user. Kydd suggested development and use of a debiasing technique that was internal to a system. To do such, understanding of biases and their complexities is required.

Lim and Benbasat (1997) discuss a framework for examining group judgment biases in their work on Group Support Systems (GSS), focusing on representativeness and availability bias. They propose that support systems designed to reduce judgment biases must incorporate components that facilitate information exchange, idea generation, and problem representation to reduce bias and indicate that in a task with no right answer (i.e., a judgmental task (Kaplan and Miller, 1987)) a cognitive tool may help a decision-maker "realize or ascertain his or her preferences" (p. 22). They encourage further exploration of this hypothesis. An understanding of complex problem situations and decision scenarios and the human characteristics that impact them is a step toward this exploration. While cognitive biases and their effect upon ethical judgment are clearly important, an understanding of perspective and how it is related to ethical decision making is also necessary.

A perspective is a lens through which the world is viewed. Perspectives that are "naturally" taken by a problem solver have many interacting antecedents. For example, one antecedent may be a particular value. Values (beliefs about appropriate purposes of- and approaches to- life) are perhaps most clearly identified with perspective-taking. Values "help people explain, coordinate, and rationalize behavior" (Feather, 1999). If one values social norms strongly, they cannot also value openness-to-new-ideas to a large extent, within a particular problem-solving scenario (Schwartz, 1992). In addition to values, people's perspectives are constrained by their cognitive ability. One research area of cognitive ability is the study of moral development. According to the founder of this research area, Lawrence Kohlberg, persons vary in their ability to consider ethical problems, and that during a lifetime persons proceed through developmental stages (Kohlberg, 1969). While many have found issue with Kohlberg's moral developmental model, the basic idea that individuals have varying cognitive abilities that affect perspective is well accepted.

Taking a perspective can be two-edged sword. While a perspective helps a problem solver focus and see intricacies of the problem at hand, a perspective also serves to limit and constrain the problem-solver's understanding of the problem. If one perspective constrains the view of a problem, use of multiple perspectives should serve to reduce the lack of visibility by situating the problem-solver at various, alternative vantage points. Consequently, a broader appreciation of a problem-solving domain (i.e., considering more than one perspective) may enable a problem solver to recognize objectives that may not have been so evident initially. Broadening a problem-solver's perspective provides a basis for more productive information gathering and better communication, and enhanced mental models, which may ultimately lead to development of better alternatives from which to choose a solution.

By understanding that one's (or a group's) "natural" perspectives (purportedly affected by cognitive or emotional abilities, knowledge, experiences, personalities, values, attitudes, and beliefs) affects his/her or their problem solving approach, and by understanding that alternative approaches exist, the problem solver(s) can develop a broader appreciation of a problem domain and enable the problem solver(s) to recognize objectives that may not have been so evident initially. The problem solver(s) may become more productive information gatherers and better communicators. Better and more information, considered and communicated more often and clearly, should lead to enhanced mental models, which may

ultimately lead to development of better alternatives (or components) from which to choose (or create) a solution. Additionally, understanding how others view issues is fundamental to collaborative working and such may be negatively impacted by deeply held value-based beliefs, ethical beliefs, or emotional reaction to a decision context.

Conclusion

While there is study of ethics in organizations and decision aids in information systems, there is little study of personal characteristics or their relation to cognitive, behavioral, and social processes, and how these processes are used when individuals and groups of individuals consider ethical dilemmas. Interest in the distinctively human level-of-analysis of organizations is increasing. This interest suggests the need to understand how organizations can recognize and capitalize upon human characteristics such as feelings, values and other beliefs, knowledge, experience, thinking styles, and human abilities as well as human processes such as problem solving, decision-making reasoning, and emotion. Decision aids are a mode for this transformation. We propose that a new DSS research vector be the understanding and support of complex problem solving, especially ethical problem solving, by studying the intersections of human and personal characteristics and cognitive, behavioral, and social processes, within the organizational environment.

We hope that this paper has provided the genesis for a new broader research direction outlined by a recent call for a new DSS paradigm (Courtney 2001) as well as the problems surrounding ethical decision making in organizations. New DSS for Ethics (DSSE) will help individuals, groups, and organizations become aware of and identify ethical problems not “naturally” seen, consider alternative perspectives, use resolution techniques that are not otherwise accessible, communicate collaboratively, and subsequently act upon their ethical intention.

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