# Relating Cognitive Problem–Solving Style to User Resistance

**Michael J. Mullany**
*Northland Polytechnic, New Zealand*

## INTRODUCTION

This chapter explores cognitive problem-solving style and its impact on user resistance, based on the premise that the greater the *cognitive difference* (*cognitive gap*) between users and developers, the greater the user resistance is likely to be. Mullany (1989, 2003) conducted an empirical study demonstrating this. This study contradicts the findings of Huber (1983) and supports Carey (1991) in her conclusion that cognitive style theory, as applied to IS, should not be abandoned. Mullany's findings, in fact, are the opposite. Kirton (1999, 2004) supported Mullany's results. In particular, Mullany made use of Kirton's (2004) adaption–innovation theory. The emergent instrument, called the Kirton adaption–innovation inventory (KAI; Kirton, 1999, 2004), was used by Mullany as his measure of cognitive style.

Mullany's study also investigated the relationship between user resistance and user ages and lengths of service in the organisation. It failed to show any relationship between these factors and user resistance. This countermands the findings of Bruwer (1984) and dismisses any intimation that older or longer-serving employees are necessarily more resistant to change as myths.

## BACKGROUND

Ever since the early 1980s, experts have identified user resistance to new systems as an expensive time overhead (see studies by Hirschheim & Newman, 1988, and Markus, 1983). Some authors suggest the greater importance of age and length of service. Bruwer (1984), for instance, claimed to have demonstrated that the older or longer-serving an employee, the more resistant he or she is likely to be to a new computer system. Clarification of issues surrounding user resistance has also highlighted *cognitive style theory* as potentially important, but to date, its impacts have only been sparsely researched in relation to user resistance, many of the prior studies being open to question. This research, on the other hand, proposes that a system will fail when the developer and user differ significantly in their problem-solving approaches. To reduce user resistance, it thus makes sense to recommend system designs that suit the user's approach to problem solving.

This issue appears only to have been studied empirically by Mullany (1989, 2003). He formulated the research question, "Is there a relationship between user resistance to a given information system and the difference in cognitive style between the user and the developer?" With the aid of his own instrument for measuring user resistance and the Kirton adaption–innovation instrument (Kirton, 1999) to measure the cognitive styles of users and associated system developers, he found a highly significant relationship between developer–user cognitive style differences and the level of user resistance to systems.

Why no other studies along similar lines have been reported in credible current research is difficult to explain. One possibility is that the literature contains speculative studies, such as that by Huber (1983), that discredit cognitive-style theory as a tool in understanding system success. Other studies, such as that by Carey (1991), while encouraging the continued use of cognitive-style theory in studying system phenomena, do not demonstrate its predictive success in information systems (IS). The remainder of this chapter thus examines the meaning and measure of cognitive style, the measure of user resistance, the specific findings of Mullany (1989, 2003), and outlooks for the future in this area of research.

## THE MEANING AND MEASURE OF COGNITIVE PROBLEM-SOLVING STYLE

Liu and Ginther (1999) defined *cognitive style* as, "An individual's consistent and characteristic predispositions of perceiving, remembering, organizing, processing, thinking and problem-solving." Schroder, Driver, and Streufert (1967), in a discussion of human information processing, suggested that organisms "either inherit or develop characteristic modes of thinking, adapting or responding and go on to focus upon adaptation in terms of information processing." In short, an individual exhibits characteristic ways of processing information (and, hence, solving problems), known as his or her "cognitive style." Table 1 gives an historic summary of key experts over the years who have endeavoured to name and measure the construct of cognitive style. Of these, the MBTI (Myers–Briggs type indicator) is the most used in current, credible research literature, followed by the KAI

*Table 1. Cognitive-style constructs: Key studies*

| Reference | Cognitive-Style Construct | Instrument |
|---|---|---|
| **Kelly (1955)** | Cognitive complexity or simplicity | **RepGrid** (Repertory grid) |
| **Jung (1960)** | Jungian typology | **MBTI** (Myers–Briggs type indicator) |
| **Witkin et al. (1967)** | Field dependence or independence | **EFT** (Embedded figures test) |
| **Hudson (1966)** | Converger or diverger | None |
| **Schroder et al. (1967)** | Cognitive complexity | **DDSE** (Driver's decision-style exercise) |
| **Ornstein (1973)** | Hemispherical lateralisation | Brain scan |
| **Kirton (1976)** | Adaptor–innovator continuum | **KAI** (Kirton adaption–innovation inventory) |
| **Taggart (1988)** | Whole-brain human information processing | **HIP** (Human information-processing instrument) |

(Kirton, 1976, 1984). As previously stated, the only evident effort made to relate cognitive style to user resistance was carried out by Mullany (1989) using the KAI. The reason for his preferred use of the KAI stemmed from its ability to provide a near-continuous, bipolar scale, convenient for finding correlations and associations. The MBTI, by contrast, yields only certain cognitive classifications, where no mutual order is evident. The correlation with other factors would then have been more difficult to show statistically.

Turning to the theory behind the KAI, Kirton (1999) identified two extremes of cognitive style; namely, the *adaptor* and the *innovator*. The adaptor tends to follow traditional methods of problem solving, while the innovator seeks new, often unexpected, and frequently less-accepted methods. The adaptor tends to "do well" within a given paradigm, where the innovator tends to "do differently," thus transcending accepted paradigms. The adapter is prepared to be wedded to systems, solving problems "in the right way," but is often seen as "stuck in a groove." The innovator has little regard for traditions, is often seen as creating dissonance, and elicits comments such as, "He wants to do it his own way, not the 'right' way." All humans, Kirton proposed, can be located on a continuum between the extremes of these two cognitive styles.

Both cognitive extremes can be highly creative, can resist change, and can act as agents for change. Adaptors support changes to the conservative, back to the "good old ways," and resist changes to novel methodologies. Innovators support changes toward unprecedented systems and technologies and resist changes to the traditional.

Kirton's instrument, the KAI, has been widely demonstrated to be a successful measure of his construct of cognitive problem-solving style. The instrument takes the form of a questionnaire, on which the respondent has to rate himself or herself against 33 character traits. KAI scores can range from 32 to 160, with a mean of 96 and a standard deviation of about 16. A person scoring above the mean of 96 is considered to be an innovator; conversely, a person scoring below 96 is rated as an adaptor. However, in the range of 80 to 112 (that is, within one standard deviation of the mean), a third cognitive style can be identified—the mid-scorer. Such persons tend to have human rather than technical problem-solving preferences and can relate better to the extreme scorers than either can to the other.

## A DESCRIPTION AND MEASURE OF USER RESISTANCE

Mullany (1989) measured user resistance at personal interviews with the key user of each system selected for investigation. The user was asked to list the problems that he or she recalled had occurred during the system's development and implementation. They were asked, in effect, to make complaints, in confidence, against the system and its manner of implementation. Then they were requested to rate the severity of each complaint on a seven-point scale (with seven representing the most severe weighting). The sum of severities of all the complaints measured the respondent's