

Chapter VII

Interactive IR Models

Three Major IR Models

The nature of information retrieval (IR) is interaction. However, the traditional IR model only focuses on the comparison between user input and system output. It does not illustrate the changeable interaction process (Saracevic, 1997). The human involvement of IR makes the process complicated and dynamic. Belkin (1993) further identified the two underlying assumptions of the traditional IR view: (1) The information need is static, and can be specified; and (2) there is only one form of information-seeking behavior. The limitations of the traditional IR model are becoming more evident. In the 1990s researchers started to develop interactive IR models. Among them, Ingwersen's cognitive model (1992, 1996), Belkin's episode model of interaction with texts (1996), and Saracevic's stratified model (1996a, 1997) are the most cited ones.

Ingwersen's Cognitive Model and Applications

The Basis of the Integrated IS&R Research Framework

The information-seeking and retrieval research framework has been developed for over a decade by Ingwersen (1992, 1996, 1999) and Ingwersen and Järvelin (2005). Ingwersen (1992, 1996) developed and enhanced the cognitive model of IR interaction, which set up the foundation for the integrated IS&R research framework proposed by Ingwersen and Järvelin (2005). The five components (an individual user's cognitive space, a user's social-organizational environment, the interface/intermediary, the information objects, and the IR system setting), the cognitive transformation and influence from one component to another, and the interactive communication of cognitive structures via an interface or intermediary constitute the cognitive model of interaction. In this model, "cognitive structures are manifestations of human cognition, reflection or ideas. In IR they take the form of transformation generated by a variety of human actors" (Ingwersen, 1996, p. 8).

Ingwersen and Järvelin (2005) proposed an integrated IS&R research framework based on the holistic cognitive viewpoint and relevant theoretical and empirical research in information-seeking and retrieval. The shift to the holistic cognitive view started in the 1990s. Situational relevance (Schamber, Eisenberg, & Nilan, 1990), the proposal for relevant, cognitive, and the interactive revolution (Robertson & Hancock-Beaulieu, 1992), and De May's (1980, 1982) view of cognition in contextual social interaction and the four evolutionary stages of information processing are the theoretical basis for Ingwersen's 1992 and 1996 IR model from an interactive perspective. Theoretical and empirical research in information-seeking and retrieval come from three areas: (1) The development of information-seeking research from 1960 to 2000, especially information-seeking models represented by Dervin's sense-making approach (Dervin, 1983; Dervin & Nilan, 1986), Ellis' information-seeking features (Ellis, 1989; Ellis, Cox, & Hall, 1993), Kuhlthau's process model (1991), Wilson's model on information behavior (Wilson 1997, 1999), and a model on task-based information-seeking (Byström & Järvelin, 1995; Vakkari, 1998; Vakkari & Kuokkanen, 1997), and so forth; (2) the development of system-oriented information retrieval research from 1960 to the present including the development of several major mathematical retrieval models and the discussion of major issues and findings in systems-oriented research, such as document, request, and relevance; interaction and query modification; and so forth; and (3) the development of cognitive and user-oriented IR research exemplified by models of cognitive IR, such as the conceptual models by Ingwersen (1992, 1996) and Saracevic (1996a), and so forth; cognitive information-seeking and retrieval theory-building represented by Taylor's information need formation (Taylor, 1968); the ASK hypothesis (Belkin, Oddy, & Brooks, 1982a, 1982b), and so forth; and research on searchers' behavior,

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