

# *Research Methods in Leisure Research*

## *Les methodes de recherche en recherche sur les loisirs*

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### **Implementing Entity-Relationship Theory for Handling Leisure and Cultural Information**

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#### **INTRODUCTION**

Prior to the late 1970s, computerized information handling was constrained by physical structures imposed by system architecture. The concept of "data modelling" - that is the *logical associations* between data items in a database (Harrington, 1988) - was a topic of concern primarily among mathematicians and computer scientists, not the run-of-the-mill researcher who wanted to use a computer to store, process, and analyze data.

A "logical" structure alludes to the physical independence of data, or the way a researcher views information; that is, a conceptual schema which theorises that *any variable may rationally be associated with any other variable*. When there is physical data item independence, it is possible to use any data item within a computer application without concern for the physical structure of the files in which data are stored - it is possible to test a researcher's notion that a certain variable is associated with another variable.

The usual "logical" data structure in the 1970s was a two dimensional symmetrical rectangular matrix composed of very limited fixed length columns and rows. Each column represented one logical type of information and each row represented one "case" or "record" of respondent information. Each record or row in a stored file was required to have the same number of data items as all other records or rows in the file. This arrangement not only constituted the logical structure, but was the physical database structure as well. Consequently, certain styles of data analysis were inhibited.

Furthermore, the *modus operandi* of underlying computer programming languages at the time placed another, more severe constraint on a researcher's logical conceptual schema. All data items — regardless of their nature or "type" -- were required to be "translated" or "coded" and entered into the computer as digits. Logically, a data item:

...inherits a set of fundamental attributes of the data type to which it belongs. A data object can take on a value that resides within the range of legitimate values for the data type and can be manipulated by operations that apply to the data type (Pressman, 1987, p. 412).

In a variety of ways, "coding" all data as "digits" created an even more illogical strain upon leisure research in that it forced researchers to conceptualize all data as numbers (rather than as their logical types) at the design stage, prior to data collection, and this had the effect of constraining the analysis a researcher intended to undertake (Danchuk, 1988). Logical associations among information items were either ignored, manually processed, or subject to the oft heard phrase "the

computer can't do that!". Perhaps one of the most important unintended findings of the Canadian Outdoor Recreation Demand Study (CORDS) was that given the then present state of information handling and analysis, various modes of inquiry were extremely limited if not impossible (Avedon et al., 1974).

## **DISCUSSION**

Developments in the branch of mathematics known as formal logic resulted in inclusion and use of relational algebra and relational calculus within database systems. Such systems offered opportunities for information handling that were no longer constrained by physical database structures. As a consequence, starting in the late 1970s, proponents of E-R Theory began to develop logical data models for information processing in business and industry (Chen, 1977, 1983). A door was opened to creative database design, implementation, and inquiry using inherent logical associations found in "real world" information. No longer was it necessary to rely upon "rectangular files" or to "code" non-numeric data into numbers in order to process information.

New modes of data analysis and reporting became possible. By the mid-1980s, associated concepts such as Entity Theory, Normalization Theory, Referential Integrity, Platform Transportability, and "Codd's Rules" became the subject of considerable study, debate, and a flourishing literature in some quarters (Bertino, 1983; Date, 1986; Delobel and Abiba, 1983). However, for the most part, these approaches to information handling remained the province of "DP" shops within large commercial organizations which operated specially programmed "mainframe" computers. Such new resources were generally not available to most leisure researchers, particularly those in the social sciences.

By this time, however, many leisure researchers had begun to explore the use of microcomputers for research tasks. Several new topics became a concern for some researchers. Physical computing issues such as data redundancy, operating systems, analysis packages, data storage, and related matters became common interests. With the advent of "Fourth Generation Languages (4GL)" and "Object Oriented Computing", some researchers began to think about the specificity of data types in their conceptual schema (Cobb, 1985; Martin, 1985), but unless they had access to appropriate computing resources, they could not make use of such concepts and techniques. Fortuitously in the mid-1980s, a Canadian corporation introduced one of the first software development packages based upon E-R Theory (Avedon et al., 1986; Avedon and Goodman, 1987; Finkelstein, 1987; Foard, 1985; Helliwell, 1985) which made available to Canadian researchers contemporary database methodology for application in leisure research on a variety of computing platforms -including the microcomputer. Now, in addition to established research methods, E-R Theory applications might be added to a researcher's "box of tools", enabling different types of data analyses.

During the past five years, a number of Canadian (James and Stewart, 1987) and other researchers have begun to successfully adopt some of these contemporary information handling theories to leisure information handling problems, thus adding a new mode of inquiry for use in leisure research (Beaman and Grimm, 1989; Furness, 1989). No longer need a researcher's conceptual schema be limited by physical database structures. A researcher may now design a research project based upon logic, and view the computer as a tool, rather than a research constraint.

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