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Chapter 16

Facilitating End User Database Development by Working with Users' Natural Representations of Data

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One of the main advantages of user-developed applications is considered to be the greater familiarity the users themselves have with the problem domain, and hence the greater likelihood of their creating an application that meets their needs. However, it is equally frequently reported that many end users lack the skills to develop applications that are of a high quality. Database modelling and relational database design, in particular, are known to be problematic for novices. We present two case studies in which the first stage of the development process was completed entirely by the end user, making use of their own understanding of the dataset, the problem domain, and tools that were familiar to them. In each case, they had represented the data in the form of lists. An IT expert then facilitated the conversion of the dataset to a relational database, with the participation of the end users throughout the process. The end users were able to see the concepts of database design emerge naturally from a problem that was already familiar to them, and to understand their importance in a practical manner.

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INTRODUCTION

There is a large body of literature on end user computing and on user-developed applications (UDAs). UDAs are applications developed by end users, rather than IT professionals, to undertake some particular task. The basic premise of end user development is that the users themselves are in the best position to understand the requirements of the application domain and therefore to create an application tailored to their particular needs. Thus, one of the often-quoted advantages of end user application development is that it eliminates the problematic step of user requirements elicitation in the systems development life cycle (Agboola, 1998). Indeed, Lally (1995) noted that a key issue in end user computing is determining how organizations can more effectively utilise the end user's superior knowledge of the application requirements in the process of application development.

However, there is also a large body of literature pointing out the potential hazards of UDAs that are developed when users without adequate background or training develop their own applications. Lack of familiarity with development methodologies, or with application software, may result in significant errors in the final product, despite their understanding of the requirements (Panko & Halverson, 1996). Agboola (1998) attempted to separate the effects of modelling knowledge and application domain knowledge in an experimental setting, and found support for the commonly held view that application domain knowledge was less important than modelling knowledge as a predictor of database implementation correctness.

Database management systems, today overwhelmingly personal relational systems such as Microsoft Access™, FoxPro™ or FileMaker Pro™, are one of the most common types of software used to create UDAs. However, normalised relational tables are not a natural way of representing data for most people. Further, relational model concepts such as keys, functional dependency and referential integrity, essential to create a correct and flexible database, are difficult to grasp. The spreadsheet format, where information is set out in tabular format, is generally thought to be more intuitive for novices, although is certainly not immune from errors (Panko & Halverson, 1996).

Hutchins, Hollan and Norman (1985) postulated the concept of "gulf" between a user's goals and the computer interface: if the gulf between the user's goals and the computer interface is large, the user will require more effort to accomplish their goals. This gulf is made up of *semantic* distance, which is the gulf between a user's conceptualisation of the "real world" object and an abstraction of it; and *articulatory* distance, which is the gulf between the meaning or abstraction of the object and its physical form or syntax. Batra (1993) further identified *mapping* (transforming the world into a representation), *rules* (which govern the mapping) and *consistency* (between the world and the representation) as distinc-