

Book review

Quality Databases Improve Organization Efficiency and Cost Effectiveness, S. Becker, Idea Publishing Group, Hershey, PA, 2001, 384 pp.

Databases are an essential component of all organizations. As the Internet becomes more of a force in businesses and individuals' lives, it becomes ever more important to effectively capture, utilize and create information through the use of databases and associated technologies.

In the following interview, Shirley Becker, of the Florida Institute of Technology and renowned for her expertise in database technologies shares her insights into how to get the most from database technologies.

- Q. What role are databases and their associated technologies playing in the emergence of the Internet?
- A. Database practices, techniques, and technologies continue to play a significant role in riding the increasingly turbulent wave of technological advances. The Internet is having a major impact on information sharing in a global marketplace. Advances in science and engineering fields have resulted in an explosion of information that must be effectively modeled and managed. Legacy software systems have vast amounts of data ready for analysis and interpretation. These are just a few examples of the opportunities and challenges associated with today's database systems.
- Q. What is needed in order to most fully take advantage of the technological breakthroughs? What is required of database practices in order to meet the challenges of emerging technologies?
- A. Effective mechanisms for collection, storage, retrieval, analysis, and dissemination of information are needed to take advantage of technological breakthroughs. Data complexity issues need to be addressed such as, security, maintainability, completeness, and correctness, in order to minimize the risks associated with these new technologies. Innovations in database practices, techniques, and technology are needed to meet the increasing challenges of this new decade.
- Q. What are some of the important issues to consider regarding improving database practices?
- A. The diversity of issues includes quality and organizational issues, measurement systems, design and implementation methods, data warehousing and mining techniques, data modeling and re-engineering techniques, security, and enhanced query capabilities.
- Q. What are some of the organizational concept and measures used for the evaluation of data modeling?
- A. Data modeling should include both project-driven activities and enterprise-wide activities inclusive of long-term goals. There is also a need to focus on organizational issues associated with data modeling inclusive of process and product perspectives of quality.
- Q. Why is data quality an important issue?
- A. Data quality is a critical issue because databases are part of virtually all conventional and e-business applications. There is a need for a comprehensive set of quality dimensions in order to be successful in the development of high-quality database systems. In addition to process and data factors, quality dimensions should include model and behavioral factors, as these are not typically part of data quality assessment.
- Q. How can Hypermedia be integrated into database applications?
- A. A dynamic hypermedia engine (DHE) can be used to automate features associated with database systems inclusive of web technology. One such feature is the automatic generation of links based

on the database's conceptual schema with its original specification. This technology allows for the developer to specify which kinds of database elements are related to diverse elements in the same application, other database applications, or other software systems. Data warehousing and data mining could be incorporated into this technology.

- Q. What can be done to reduce the size of databases while improving their performance?
- A. Many of today's database systems require the processing of large volumes of data in order to support the discovery of new knowledge. Today's vast amount of data makes the discovery process computationally expensive. Domain knowledge may be used to reduce the size of the database and to optimize the hypothesis thus eliminating implied, unnecessary, and redundant conditions. The resulting benefits include greater efficiency and the discovery of meaningful, non-redundant, and consistent rules.
- Q. What are the benefits and drawbacks of data warehousing?
- A. Data warehousing can assist intelligent decision-making in order to improve the functioning of an organization. There are several trade-offs associated with data warehousing designs inclusive of materialized views, partitioning a data warehouse, and index selection to efficiently execute queries.
- Q. Are there many problems with today's database systems?
- A. Many of today's database systems have been poorly designed or may have become flawed when physical objects are removed. As a result, database quality suffers until it is re-engineered. Some theorize that heuristics can be used to redesign the conceptual schema, which are based on the identification of hidden business rules and the conversion of non-key inclusion dependencies into key-based ones.
- Q. How could databases be more effectively utilized by organizations?
- A. Huge investments have been made in enterprise resource planning (ERP) systems, and more value could be realized if databases semantically reflected the underlying reality of organizations.
- Q. How can the security of database systems be ensured?
- A. The Internet, electronic business, and data warehousing are a few of the technologies that have shown the need for security considerations early in the development life cycle. The principal aspects that affect confidentiality in the design of databases are control of access, modeling of security requirements, and a retrospective view of the important generations of methods for the development of security techniques. Multilevel databases can be designed while taking into consideration confidentiality requisites and risk management factors.

Shirley Becker is an Associate Professor of Computer Science at the Florida Institute of Technology. Formerly she was at American University in Washington, DC. Dr. Becker has done extensive research in numerous issues of information systems management, including innovations in teamwork, process management, and CASE and Clean room software engineering.

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