IDEA GROUP PUBLISHING
701 E. Chocolate Avenue, Hershey PA 17033-1117, USA
Tel: 717/533-8845; Fax 717/533-8661; URL-http://www.idea-group.com
ITB7079

Chapter III

Data Modeling: A Vehicle for Teaching Creative Problem Solving and Critical Appraisal Skills

Clare Atkins
Nelson Marlborough Institute of Technology, New Zealand

INTRODUCTION

Despite extensive changes in technology and methodology, anecdotal and empirical evidence (e.g., Davis et al., 1997) consistently suggests that communication and problem-solving skills are fundamental to the success of an IT professional. As two of the most valued skills in an IT graduate, they should be essential components of an effective education program, regardless of changes in student population or delivery mechanisms. While most educators would concur with this view, significantly more emphasis is generally placed on teaching the tools and techniques that students will require in their future careers, and a corresponding amount of energy is expended in attempting to identify what those tools and techniques might be. In contrast, successful problem solving is often seen either as an inherent capability that some students already possess or as a skill that some will magically acquire during the course of their studies.

Data modeling as an activity, by which we mean the gathering and analysis of users' information needs and their representation in an implementable design, is largely one of communication and problem solving and, consequently,

This chapter appears in the book, Challenges of Information Technology Education in the 21st Century by Eli Cohen.

provides an excellent opportunity for explicitly teaching these skills. Data modeling is generally considered to be one of the more difficult skills to teach (e.g., Hitchman, 1995; Pletch, 1989), particularly if the student has no previous understanding of physical data structures (de Carteret & Vidgen, 1995). The essential constructs, such as entities, attributes or objects, may be elegant in their powerful simplicity, but their combination into a useful design is a complex process of categorization in which there is "considerable room for choice and creativity in selecting the most useful classification" (Simsion, 1994 p.82). Data modeling requires not only the ability to communicate about and to solve a problem, but also to create possible solutions and then choose between them. Herein lies the difficulty. It is not enough to learn what the different constructs are, or even to study simple textbook examples of how to put them together. The student must really understand the problem, be able to create and recognize a number of possible ways in which the problem can be solved, and then exercise considerable critical skills in choosing between them.

This chapter examines these issues and describes various ways in which final-year undergraduate students, taking a specialist module in data modeling, have been encouraged to develop, and have confidence in, their creative and critical ability to solve problems in a disciplined and systematic way.

BACKGROUND

In many respects the entire systems development lifecycle (SDLC) can be considered as a complex problem-solving activity. The need to communicate effectively with all levels of users, with technical personnel and with management has long been accepted as an integral part of the process. Texts on systems analysis and design generally include at least one chapter on the topic, including basic skills of interviewing, report writing and presentations. These texts will often use the language of problem solving to describe the activities and context of the SDLC, for example referring to the system environment as the 'problem domain,' the need to 'identify the problem' and 'seeking solutions.'

In their exemplary text, Satzinger et al. (2000) speak specifically of the "Analyst as a Business Problem Solver," commenting that analysts must have both "a fundamental curiosity to explore how things are done and the determination to make them work better" (p.4). However, while they diagrammatically describe the SDLC in problem-solving terms, the book is primarily focused on detailed and clear explanations of tools, techniques, methods and methodologies, with little indication of the thinking skills that are required to synthesize information, to extract the problems and to create alternative solutions. Yet it