

# Observations on Implementing Specializations within an IT Program

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## INTRODUCTION

With a projected 2.26 million additional jobs to fill in various computer fields by the year 2010, there are and will continue to be ample job opportunities in the computer industry. However, the computer field is far too broad for one individual to be an expert in the entire field. Therefore it may be more useful for students to have the opportunity to concentrate their studies in a specific interest area within a broader Information Technology (IT) degree.

IT educators throughout the United States (US) have paid attention to the needs and demands of the IT industry. To address the need for IT graduates with specialized skills, many of the leading universities have created programs which allow undergraduate students to specialize or focus their studies.

This chapter will discuss findings on the state of IT programs with regards to their course offerings. One area of specialization, or track, is presented as an example. It will be noted that even within a specialty area, there can be further specializations. In addition to supporting the students pursuing the specialty area, general knowledge courses must also be offered to those pursuing other specialty areas.

## BACKGROUND

The Bureau of Labor Statistics reported 2.9 million computer-related jobs in 2000, with an expected 4.89 million computer jobs by the year 2010. Considering new jobs as well as replacements, over 2.26 million additional people will be needed to fill these jobs (Hecker, 2001). The fluid nature of the IT industry makes generalizations difficult. Therefore, skills are often categorized or grouped together into skill

sets (or job descriptions). The most common clustering of skills has been summarized in Table 1.

Of these pathways (or specialization tracks), two of the top occupations (as predicted by the US Dept of Labor) are systems analysis and database administrators (which have been grouped in the EDC Information Support and Service Pathway). See Table 2 for a listing of the top growth occupations.

## WHERE ARE THE SPECIALIZED IT PROGRAMS?

Published curriculum from the institutes who attended the Conference for IT Curriculum (CITC) II held in April of 2002 were used as the sample set. The conference attendees were primarily IT educators from around the US, who had an interest in IT curriculum issues. An IT curriculum is focused on the application of technologies to solve problems. To differentiate, a traditional Computer Science curriculum is focused on algorithm design.

Table 3 illustrates, that out of the 28 programs studied, 50% (14) had some specialization available for students. Of the 14 programs that offered specializations, 45% (6) of those offered at least a database specialization similar to our sample track.

## NEED FOR A DATABASE TRACK

The same data from the Bureau of Labor Statistics (Hecker, 2001) indicates there were 106,000 jobs for database administrators (DBAs) in 2000, with a projected 176,000 openings to fill by the year 2010. In addition to DBAs, there are also

*Table 1. Summary of educational pathways*

- Network Systems Pathway
- Information Support and Service Pathway
- Programming and Software Development Pathway
- Interactive Media Pathway

From EDC (2002)

*Table 2. Percentage change in employment, projected 1998-2008*

Occupation	Percent change
Computer engineers	108
Computer support specialists	102
Systems analysts	94
Database administrators	77
	From U.S. Dept. of Labor

database professionals who specialize in database architecture and database programming.

## ANATOMY OF A DATABASE TRACK

Though there are various job titles given to database activities in the workplace, such as these listed on the ITWORKS-OHIO website: Data Analyst, Database Administrator, Database Analyst, Database Developer, and Database Specialist—many others exist in the marketplace. However,

based on the author's opinion, when the job descriptions are examined, one can find that there are really three, inter-related roles. Figure 1 illustrates these roles using the structure of a house as an example. The DBA (as the foundation) keeps a database available, secure, and healthy. Without the DBA, the rest of the database team could not function. The database developer (as the framing of the house) encodes the business logic in the database. Additionally the database developer often develops the interface layer between the system software and the database engine. Lastly, the database architect (as the roof of the house) is often a senior staff member. Typical

*Table 3. Programs and specializations*

INSTITUTION NAME	SPECIALAZATION	DATABASE SPECIALIZATION
Ball State	NO	
Bentley	NO	
Brigham-Young University (BYU)	NO	
BYU-Hawaii	NO	
BYU-Idaho	NO	
Capella	YES	NO
Drexel	YES	YES
Florida State University	YES	NO
Georgia Southern	NO	
George Mason University	YES	NO
Hawaii at Manoa	NO	
Houston	NO	
Indiana University	YES	NO
Indiana University Purdue University at Indianapolis	YES	NO
Macon State	YES	YES
New Jersey Institute of Technology	YES	NO
Northern Alabama	YES	NO
Pace Univerisy	NO	
Pennsylvania College of Technology	YES	NO
Purdue University	YES	YES
Purdue University - Calumet	YES	YES
Rochester Institute of Technology	YES	YES
Southern Alabama	YES	YES
State University of New York (SUNY) Morrisville	NO	
Towson University	NO	
University of Baltimore	NO	
University of Cincinnati-Clermont	NO	
USCS	NO	

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