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Computing Curricula:
A Comparison of Models

Anthony Scime & Christine Wania

State University of New York College at Brockport, USA

ABSTRACT

An analysis of eight computing model curricula verifies that there are significant differences between computing disciplines. While there are many courses in the models with the same or similar names, the courses may be completely different. By reverse engineering model course descriptions, the courses are compared to determine the inclusiveness of each course in each of the others. Although expected, these results are significant for colleges and universities establishing or revising computing programs.

Keywords: computer science curriculum model; computer science education; curriculum design; curriculum development; data mining; higher education; IS curriculum; IS discipline; IS professional societies; IS professionals; IS programs; IS skills; IS students; IT education; keyword query; MIS curriculum; MIS program; semantic matching; strategic planning in education; undergraduate education

INTRODUCTION

The use of computers has become ubiquitous in society today. Yet, most of society does not understand computing as a field of study. Even the computing professionals and academics are only now coming to understand the variances in the computing disciplines (Landry, Pardue, & Longenecker, 2003).

Education, engineering, and medicine are more clearly understood disciplines. Grade level and subject matter divide the education disciplines. Distinctions are made in work and education between civil and mechanical engineering. People seek out surgeons or internists for different medical conditions. Of course, these disciplines are older than computing and have developed these specializations overtime.

Much specialization occurs because a discipline expands to the extent that individuals lack the capacity to assimilate all the disciplines' knowledge. As a result,

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subsets of knowledge emerge as specialties (Stark & Lattuca, 1997). The computer disciplines are beginning to form into specialized fields. These fields, however, do not derive from a common reference discipline, as civil and mechanical engineering derived from military engineering. Rather, the different computing specializations came from different reference disciplines, primarily management, mathematics, or engineering (Scime, 2002c).

As a result of these various origins, computing professionals have organized themselves into different professional organizations to share information and promote the profession. These professional organizations provide guidance concerning the particular knowledge necessary to be successful in the profession. This in turn influences the academic programs. The most direct method professional organizations have used to influence academics is the curriculum model. These models describe the topics to be covered in a program's curriculum. Typically these topics are organized as semester length (15-week) courses. Some of the models provide detailed knowledge units, comprising the discipline's body of knowledge which are then organized into courses. Other models take a more subjective approach, providing just a course title, leaving it to the program developer to interpret course content.

While it is unlikely that an electrical engineer would be hired to design a distillation column (a chemical engineering task), industry hires entry-level employees for computing positions, often without regard for the specific computing program. Entry-level jobs such as programmer, help desk worker, or network or database administrator will go to graduates of any of the computing disciplines. This may be because the courses in the disciplines appear the same. While it is recognized that it no longer holds that the traditional career path is from programmer to systems analyst to project manager and eventually to IS manager (Urquhart, Perez, Rhoden, & Lamp, 1996), the differences in computing programs are not always appreciated in industry.

This study is an analysis of computing curriculum models to understand their similarities and differences. It begins with outlining the work preformed in the profession, followed by a discussion of the models, and then a topic analysis of model courses, comparing individual courses to one another and the models as a whole to each other.

REVIEW OF THE LITERATURE

Computing as a Profession

The members of the computing profession have come together in various professional societies. These organizations provide an outlet for the exchange of information and provide a venue for discussion forums about computing. These groups may be primarily composed of practitioners or academics.

Table 1 outlines the type of members in professional organizations sponsoring or endorsing a model curriculum. Although most organizations may have academic and practitioner members, the