Computing Curricula: 
A Comparison of Models

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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 over time.

Much specialization occurs because a discipline expands to the extent that individuals lack the capacity to assimilate all the disciplines’ knowledge. As a result,
subsets of knowledge emerge as special-
ties (Stark & Lattuca, 1997). The com-
puter disciplines are beginning to form into
specialized fields. These fields, however,
do not derive from a common reference
discipline, as civil and mechanical engineer-
ing derived from military engineering.
Rather, the different computing specializa-
tions came from different reference disci-
plines, primarily management, mathemat-
ics, or engineering (Scime, 2002c).

As a result of these various origins,
computing professionals have organized
themselves into different professional or-
ganizations to share information and pro-
 mote the profession. These professional
organizations provide guidance concern-
ing the particular knowledge necessary to
be successful in the profession. This in turn
influences the academic programs. The
most direct method professional organi-
zations have used to influence academics
is the curriculum model. These models
describe the topics to be covered in a
program’s curriculum. Typically these top-
ics are organized as semester length (15-
week) courses. Some of the models pro-
vide detailed knowledge units, compris-
ing the discipline’s body of knowledge
which are then organized into courses.
Other models take a more subjective ap-
proach, providing just a course title, leav-
ing it to the program developer to inter-
pret course content.

While it is unlikely that an electrical
engineer would be hired to design a distil-
lation column (a chemical engineering
task), industry hires entry-level employ-
ees for computing positions, often with-
out regard for the specific computing pro-
gram. Entry-level jobs such as program-
mer, help desk worker, or network or
database administrator will go to gradu-
ates 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 program-
ner to systems analyst to project man-
ager and eventually to IS manager
(Urquhart, Perez, Rhoden, & Lamp, 1996),
the differences in computing pro-
grams are not always appreciated in in-
dustry.

This study is an analysis of comput-
ing curriculum models to understand their
similarities and differences. It begins with
outlining the work preformed in the pro-
fession, 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 pro-
ofession have come together in various pro-
ofessional societies. These organizations
provide an outlet for the exchange of in-
formation and provide a venue for discus-
sion forums about computing. These
groups may be primarily composed of prac-
titioners or academics.

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