

A Comparative Analysis of Program Curriculum in Selected Distance Education Information Systems Programs

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Abstract

A traditional indicator of quality in an educational program has been the curriculum offered in the program. One means for making a quality comparison between on-campus and distance learning programs would be to study the curriculum offered in a distance education program and compare it to a standardized, model curriculum. This study seeks to determine whether conformance of curriculum to a standardized model can be used as an indicator of program quality in distance education programs. By analyzing the curriculum in several Information Systems (IS) programs offered through Internet-based distance education, the current study attempts to determine whether conformance of curriculum to a standardized model, such as the MSIS 2000 Model Curriculum, can effectively be used as a determining indicator of program quality.

Keywords: distance education, information systems curriculum, graduate is programs

1. INTRODUCTION

Quality in distance education programs is a major topic of discussion among academics. A major question in the literature is how well the online learning experience matches and corresponds to a traditional on-campus program. An inherent assumption in the discussion is that a traditional on-campus program is a model for a quality educational experience. A traditional indicator of quality in an educational program has been the curriculum offered in the program. A means of making a comparison between on-campus and distance learning programs would be to study the curriculum offered in a distance education program and compare it to a standardized, model curriculum. This study seeks to determine whether conformance of curriculum to a standardized model can be used as an indicator of program quality in distance education programs.

With the increasing number of Internet-based, higher education distance learning programs that are available, issues related

to the quality of distance education programs have become topics of considerable discussion. In the vast majority of these discussions, the issues are related to quality of individual course design, program services for students such as course registration or library services, or faculty workload. One area that is lacking in research is curriculum design and development at the programmatic level for online programs. When addressed at all, issues in curricula for distance education programs tend to focus on techniques that are used at the course level rather than at the programmatic level.

One explanation for this focus is that it is difficult to find a standardized curriculum base for most disciplines in higher education. Although one can safely say that the vast majority of academic disciplines have a unique base-level body of knowledge, known to both scholars and practitioners that provides the basis for decisions related to the curriculum in that area, it is rare that this common body of knowledge has been codified into a standardized, common curriculum. Because of this, it is difficult to make

curricular comparisons that are not inherently subjective.

One discipline where the problem is somewhat lessened is in Information Systems. Four iterations (in 1972, 1982, 1997, and 2000) of a model standardized curriculum at the masters degree level have been devised through the work of the Association for Computing Machinery (ACM), the Data Processing Management Association (DPMA), and the Association for Information Systems (AIS). The most current standardized curriculum was based on an analysis of over fifty graduate level programs in information systems. The model curriculum was designed to serve as a set of standards for schools to use to define the curriculum within an IS program. Specifically, the objective of the model curriculum is to specify a minimum, common body of knowledge that all Master of Science in Information Systems (MSIS) graduates should know (Gorgone, 2000). As such, this standardized curriculum provides a base against which programs in information systems can be compared and contrasted in a uniform and objective manner.

The purpose of the current study is to analyze the curriculum in several Information Systems (IS) programs offered through Internet-based distance education to determine whether conformance of curriculum to a standardized model can be used as a determining indicator of program quality.

2. STUDY METHODOLOGY

The overall methodology of the current investigation was derived from the work of a similar nature Maier and Gambill (1996) performed to develop an analysis of CIS and MIS curriculums in AACSB-accredited colleges.

The descriptive portion of the study concentrated on data collected from eleven regionally accredited distance learning IS programs, one university in the process of seeking regional accreditation, 1 nationally accredited university, 1 Canadian accredited program, 1 California state approved institution, and 1 Florida state licensed school. These institutions are:

- Athabasca University,
- Capella University,

- Drexel University,
- IMPAC University,
- ISIM University,
- New Jersey Institute of Technology (NJIT),
- Northcentral University (NCU),
- Nova Southeastern University (NSU),
- Regis University,
- Rensselaer Polytechnic Institute (RPI),
- Rochester Institute of Technology (RIT),
- Southwestern Missouri State University (SMSU),
- Southern California University for Professional Studies (SCUPS),
- National Technological University (NTU),
- University of Maryland University College (UMUC), and
- University of Phoenix (UofP)

These programs were selected based on their presence in several web-based guides to distance learning programs (gradschools.com, Peterson's, degree.net) and frequent recommendations in the alt.education.distance USENET news group and degreeinfo.com discussion group. This study uses the same methodology for locating likely candidate programs as Reif and Kruck (2000) with a primary difference being that they were looking at undergraduate programs.

Only schools that offered a Master of Science in Information Systems (or a closely allied field) were included in the study. All data was collected directly from the web sites of the individual programs (as of July 20, 2002).

The analytic portion of the study was based on "MSIS 2000: Model Curriculum and Guidelines for Graduate Degree Programs in Information Systems", published by ACM and AIS. The four major tasks in the analysis included:

1. developing a baseline for the programmatic offerings in distance education IS programs,
2. contrasting distance education IS programs to their on campus counterparts,

3. comparing both to the "best practice" of the ACM/AIS standardized curriculum, and
4. providing a point of reference for curriculum strategy.

Of the 16 programs studied, eight offered conventional on-campus programs. In all eight cases, the on-campus programs have the same curriculum, entry requirements, and program requirements as the online program.

3. DISCUSSION OF RESULTS

An issue that arose immediately was the inconsistency in the naming of degree programs in Information Systems. This problem has been discussed by Gambill, Clark, and Maier as being part of the general "identity crisis" Information Systems, as a discipline, has. In their study they note:

"IS suffers from an identify crisis in the academic community because of various names used to distinguish one major from another. This identity crisis occurs within the discipline itself and between related majors. Within the discipline, a variety of names for majors, such as CIS, MIS, BIS, and IS are commonly used. In some cases, the name was chosen to send a message about the program on such dimensions as technical emphasis or managerial emphasis. In other cases, the name was chosen out of convenience or expediency. ...it is complicated by the presence of computer science programs with a "business" emphasis." (Gambill, Clark, and Maier, 1999)

In their study, they found there were no significant differences in curricular emphasis among programs with different names. Their comments about this include the observation that some consider the MIS to be a more managerial major and CIS a more technical major, but the data from their study do not support this distinction. In a somewhat amusing anecdote, they note that one program, because it was losing majors, re-named itself from MIS to CIS in order to make it clear to students that wanted to "study computers" what the program was about. An additional benefit was that their program was now listed first, even before

computer science itself, in the listing of majors (Gambill, Clark, and Maier, 1999).

The Gambill, Clark, and Maier study reaffirmed the results of Gorgone, Gray, and Davis (1988) who found a great variety of synonyms for Information Systems programs. The top three most commonly used program names were MSIS (Master of Science in Information Systems), MSMIS (Master of Science in Management Information Systems), and MSCIS (Master of Science in Computer Information Systems). In the current study, the most commonly occurring degree name was MSIT (Master of Science in Information Technology), followed by MSIS, MSCIS, MSMIS, MSCIT (Master of Science in Computer Information Technology), and an MBA (Master's in Business Administration) in MIS.

Some of this diversity may be due to the nature of MIS itself and its reliance on other "reference" disciplines. Vogel and Wetherbe (1984) have noted that "it is sometimes difficult to identify where MIS begins when trying to distinguish it from other disciplines because it draws from many other areas" such as Computer Science, Management Science, Management Accounting, Management, and Human Behavior.

Simon, Sakaguchi, and Wilkes (1999) note that Davis and Olson (1985) come up with basically the same list of reference disciplines from which MIS draws its base of knowledge as do Vogel and Wetherbe. So, it would appear that there is a certain amount of agreement of what the reference disciplines are. However, a significant factor may be the varying amount of influence each reference discipline has on a particular program. Although having allied reference fields is not a situation that is unique to MIS, Gorla notes that the phenomenon is one that is especially noticeable in MIS (Gorla, 1989) and as such affects the discipline much more so than is the case in other areas.

It seems significant that of the programs surveyed during the development of the MSIS 2000 curriculum, the majority of programs (51%) were in a school of business (Gorgone, 2000); however, in the current study, only 14% of the MSIS programs were in a school of business. This and the influence of program name, which may reflect

the underlying influence of the reference discipline, may account for some of the findings in this study.

Immediately evident is a lack of adherence to the standardized curriculum, regardless of how one looks at the data. The MSIS 2000 model IS curriculum contains 3 fundamental areas, 6 core topics, 3 business topics, and 15 elective areas (Table 1).

code	Area
B1	Accounting
B2	Organizational Behavior
B3	Marketing
F1	Fundamentals
F2	Hardware and Software
F3	Program, Data, Object Structures
C1	Data Management
C2	Systems Analysis, Modeling, and Design
C3	Data Communications and Networking
C4	Project and Change Management
C5	IT Policy and Strategy
C6	Integration Course
T0	Research
T1	Consulting
T2	Decision Support
T3	Electronic Commerce
T4	Enterprise Resource Planning
T5	Globalization
T6	Human Factors
T7	Knowledge Management
T8	Managing IS
T9	Advanced Project Management
T10	Advanced Systems Analysis and Design
T11	Technology Management
T12	Telecommunications
T13	Advanced Data Management
T14	Multimedia/Internets

Table 1 – MSIS 2000 Curriculum Areas

However, as demonstrated in Figure 1, there is a notable lack of consistency in requirements related to the fundamental and business areas in these distance education pro-

grams. To some degree this might not be surprising because Maier and Gambill (1996) noted that conflicts exist in the existing literature on IS curriculum development which point to managers agreeing that nontechnical skills (such as those in the business areas) are more important than technical skills for higher professional advancement, but at the same time these managers argues that technical skills are essentially for success in some areas and certainly in gaining initial employment.

This is especially informative in light of their subsequent study (Maier and Gambill, 1997) that found

“One of the problems with CIS/MIS graduate programs is the perception that the CIS/MIS degree is a technical degree lacking coverage of critical business functions such as marketing, accounting, and operations.”

In the case of this study, it would seem that the lack of course work in the business area requirements is most likely due to the fact that most of the programs are not situated in a business school. And while it is true that in the fundamental areas, 80% of the programs require at least one of the fundamental courses, 3 programs (SMSU, Renssaeler, and UofP) require none of them. This is particularly interesting as all three of these institutions have on-campus programs that do not require the fundamental courses either and two of these schools are AACSB-accredited.

Within the core area, another surprise is that the distribution of courses differs from that found in other IS curriculum analyses. Maier and Gambill (1997) reported that the most commonly offered courses in IS were:

- Management of IT,
- Database Systems,
- Systems Analysis,
- Decision Support Systems,
- Data Communications, and
- Hardware/Software Concepts.

In this study, the most commonly offered courses were:

- Data Communications (16 programs),

- Data Management (13 programs),
- Project/Change Management (11 programs),
- A capstone course (10 programs),
- Systems Analysis (10 programs),
- Multimedia and Internets (9 programs), and
- Fundamentals (9 programs)

Making direct comparisons of similarly titled programs, there is still considerable variation in course offerings and program emphasis. The MSIT programs offered at ISIM, UMUC, Rochester, Rensselaer, and Capella demonstrate this vividly. Although all are Master of Science in Information Technology degrees, the only common course across these five programs is the program capstone. Data Communications is also offered across all five programs, but it only a required course in four of the programs. In the MSIS programs, only two courses are common requirements among the three programs (NJIT, Drexel, and NTU), data communications and data management.

There are several possible reasons for this great divergence in curriculum. Many studies in the literature focus on the shortcomings of traditional curriculum and the need to promote change. For example, Trauth, Farwell, and Lee (1993) noted that

“Activities associated with the formal systems development life cycle will diminish in importance, while activities associated with the integrator role should begin to take center stage. While analysis skills will remain important, they will involve more than the traditional “systems analysis” skills required to critically assess business problems.”

In a study by Gill and Hu (1998) they note that

“While relational databases remain the mainstay of IS graduate programs, systems analysis and design, 3GLs (particularly COBOL) and managing IS implementations have all dropped off the top ten list (of subjects taught). Internet, client/server, and emerging technologies have shown the greatest increase in importance...these changes appear to be consistent with major trends in real world of information technologies.”

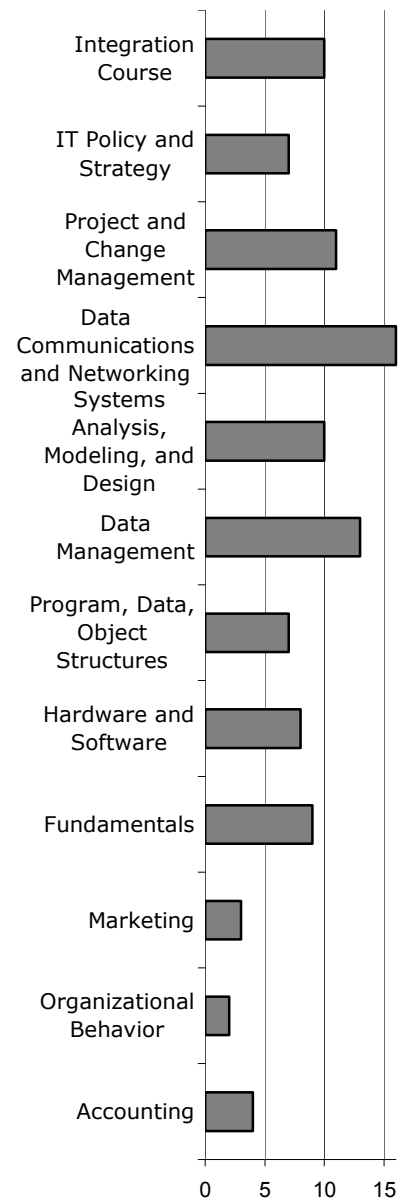


Figure 1 - Number of programs requiring fundamental, core, and business area courses

This variability within the various programs was further demonstrated by the number of requirements in programs that fit none of the categories within the MSIS model curriculum. As can be seen in table 2, many of these areas address “hot topic” issues in IS, such as emerging technologies, organizational transformation, ethics, and communi-

cation skills. In this regard, these programs seem "to illustrate how university planners must consider their educational missions carefully and must not be constrained by traditional academic biases in designing more effective and relevant curricula to match the needs of the targeted students" (Lee, 1995).

Clearly, the variation in offerings within programs discounts the notion that a standardized curriculum exists in actual practice. Even in the traditional program world, Maier and Gambill (1997) concluded that

"Graduate programs in CIS/MIS tend to be very flexible and management oriented. Relatively few courses are required, while there appears to be a wide variety of elective course offerings. Emphasis appears to be given to Systems Analysis and Design, Database Management, Telecommunications, Decision Support and Expert Systems, and Artificial Intelligence. Emphasis is lacking in state-of-the-art topics such as multimedia, client/server technology and applications, strategic applications of IT, object-oriented technology, international/global aspects of IT, and CASE."

In MBA programs, one might expect more consistency, but as Gill and Hu (1998) discovered, there is a wide range of requirements in MBA programs as well. They discovered that half of the institutions which offered MBAs with an IS track required only 10-15 credit hours in IS and one-third required fewer than nine credit hours. The result is that 79% of all the MBA programs with an IS track required less than five IS courses. This might seem surprising given that most of these programs are AACSB-accredited, but as Simon and Wang (1999) point out, there is no inclusion of IS in the AACSB standards for core education.

However, some programs do conform more closely to the standard than others. A discernable trend in the program offerings is that programs specifically geared toward the mid-career practitioner, such as those at IMPAC, UMUC, Nova, NCU, Capella, and Drexel, tend to follow the standardized guidelines in the areas of fundamentals and core programs more closely than the other

programs studied do. Athabasca's program follows the guidelines most closely (but not completely) because it was developed from the MSIS 2000 guidelines.

COURSE AREA	PROGRAMS REQUIRING COURSE IN AREA
Communications and Interpersonal Skills	4
Leadership	1
Operations Management	1
Ethics and Legal Environment	2
Persuasion and Presentation Skills	1
Emerging Technologies	1
Software Engineering	4
Human Resources and Staffing	1
Operating Systems	2
Organizational Transformation	1
System Selection Methodologies	2
Programming	3
Client-Server and Distributed Computing	1
Programming Management	1
Risk Management	2
Computer Architecture	2

Table 2 - Requirements not in the standardized curriculum

It is also apparent that curricular innovation is occurring within these problems and this is an interesting development because the issue of sluggishness in IS curriculum revision is a common theme throughout the literature. Maglitta (1996) is only the latest of authors to observe that "only a handful (of the IS programs evaluated) exposed students to most of the technical skills desired by industry." Maier and Gambill (1996) took note of the problem as well when stating "closer examination of the data suggests that CIS/MIS curricula may indeed be slow in responding to current needs." This shouldn't be surprising given Lightfoot's (1999) estimate that it takes anywhere from five to eight years for curricular change to

take effect given the environment most academic institutions and faculty find themselves in. The need for innovation within this environment was documented by Lee, Trauth, and Farwell (1995).

"Given the many resource and academic accreditation constraints, universities must be more innovative in designing their programs in order to add breadth, depth, and relevance to the curriculum. Trauth (1988) suggests that a variety of mechanisms such as a joint degree, an interdisciplinary degree, or a combined undergraduate/graduate degree could be explored to achieve these goals."

Given this background of thought regarding curricular innovation, it is not surprising that this innovation is based in an anti-standardized curriculum model. In 1995, Lee, Trauth, and Farwell declared

"The concept of a generic curriculum to meet the educational needs of all future IS professionals is obsolete. Moreover, IS educators should convince influential university accreditation bodies such as the AACSB, or professional groups such as the ACM and DPMA that provide IS curriculum guidelines, about the need for more freedom in IS curricula design."

In response, in 1999, Lightfoot developed a framework for a graduate IS curriculum that featured a common core of IS courses that feed into several specialization tracks. This model flows from the work of Haworth and Van Wetering (1994) who suggested the use of tracks as a means for providing for specialization. RIT, Rensselaer, Regis, and NJIT have all adopted this approach in their programs.

A fundamental problem within the IS curriculum is the delicate balancing act between providing theory from which to develop further knowledge, providing practical training for the workplace, and developing a specialization in a particular area. Lightfoot (1999) alludes to these problems in the comments that

"A key part of deep understanding is developing a framework of background knowledge and concepts so that facts and experiences have a context...Developing a deep understanding

of IS requires that the curriculum cover the fundamental principles of programming logic, algorithms, and data structures – concepts that underlie every programming language and end-user tool that has ever been developed...A successful career can no longer be based on a single application or programming language because the field changes so quickly"

That these concepts can be successfully applied is demonstrated by the work of Srinivasan, Guan, and Wright (1999) who document the creation of

"a new curriculum (that) emphasizes current information systems technology and development tools while still providing the foundation of knowledge needed to adapt to each successive generation of technology"

What is particularly interesting is where this curricular innovation is occurring. Whereas one might expect innovation to be occurring in newer schools or programs that are completely online, this is not actually the case. Except for Nova and Drexel (which are 4th and 3rd tier national institutions, respectively), none of these practitioner programs are in schools that are ranked and it is these practitioner programs that are the most traditional in regard to subjects taught. Of the remaining programs, the majority of the schools are ranked and those rankings tend to be high, either at the regional or national level, except for NJIT, which is a 3rd tier national institution. It is these programs that tend to have the most divergence from the standardized curriculum.

4. CONCLUSIONS

This exploratory study is an initial effort to determine the role of a standardized curriculum on the quality of Internet-based, distance education programs.

In general, it can be stated that defining exactly what constitutes an Information Systems program is in itself problematic, even though a standardized curriculum exists. Of the current Information Science programs delivered in distance mode, none completely conform to the standardized graduate-level model curriculum and the majority of pro-

grams do not follow it very closely. Even among similarly titled programs, there is very little commonality in the required courses among the programs.

A distinct pattern is that online programs specifically geared toward the mid-career practitioner tend to follow the standardized curriculum more closely than other programs. These programs tend to be in schools that are not commonly academically ranked against their peer institutions.

Programs in schools that are ranked highly, either nationally or regionally, tend to have the most divergence from the standardized curriculum. At the same time, these are the institutions where the distance education and on-campus programs are exactly the same. Therefore, it does not seem reasonable to claim that conformance of curriculum to a standardized model can be used as an indicator of program quality either on-campus or off-campus.

5. FUTURE RESEARCH

This study focused on 16 programs that are most frequently mentioned in distance education reference sources on the Internet. A more complete analysis needs to be done to determine whether the results of this study are applicable across all IS programs offered online. Extending that, the next step would be to determine if the results are similar across disciplines.

As a result of this study, related research in several other areas is appropriate. It is clear that conformance to a standardized curriculum was not a significant motivating factor in the curricular decisions of the programs under study. An obvious question then is what are the factors that are or are not molding the curriculum? Do highly ranked schools have more freedom in taking curriculum in divergent areas? Are distance education programs actually less flexible in establishing curricular requirements due to other forces, such as the need for legitimacy or stricter accreditation rules? Does the mission of the university have an effect on the curriculum? Does the profit or not-for-profit status of a University affect the curriculum? How do all of these factors affect innovation in the curriculum?

Answering these questions may provide insight into what factors do actually contribute to providing meaningful measures for quality distance education programs.

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