

Invited Paper

**The Times they are a Changin': How Non-
Technology Factors have Affected IS Curriculum
over Time**

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The Times they are a Changin’: How Non-Technology Factors have Affected IS Curriculum over Time

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ABSTRACT

Changes to degree programs in Information Systems are often attributed to quickly-evolving technology and the subsequent changing needs of the employers who hire IS graduates. In this paper, we explore other social and economic factors that were the inspiration for curriculum changes by assigning them to one of four eras in the IS timeline. Using enrollment figures and archival data, we identify both legitimate reasons and misconceptions that led to fluctuating programming requirements, the rise and fall of trendy courses, and the wholesale elimination of programs and faculty positions. We conclude the paper by using our findings to speculate what the future of IS education could look like and how degree programs should prepare for the next era of IS academia.

Keywords: Curriculum design & development, IS education, Careers, Computing majors

1. INTRODUCTION

This is the season of important anniversaries for the academic information systems field. In 2018, the University of Minnesota celebrated 50 years of its IS program. In 2019, the International Conference on Information Systems held its 40th conference, and the Association for Information Systems marked its 25th anniversary. Also in 2019, the *Journal of Information Systems Education* (JISE) celebrated its 30th year. This special issue of JISE, “The Changing Landscape of IS Education,” as is the case with all of these milestones, encourages reflection and retrospection. To consider how things have changed, we need to go back and examine how things used to be.

As we all hear and say frequently, the field of academic information systems is dynamic, because the area we study is dynamic. As technology changes, it drives what becomes important to industry, which drives what becomes important for us to teach our students. Thirty years ago, in 1989, we taught COBOL, there was no World Wide Web or web browsers or VoiceOverIP, we used MS-DOS 4.0, and most people used “SneakerNET” to move files between PCs. The state of IS in industry often dictates what we teach about IS in the classroom. But industry needs are not the only drivers of curriculum. We argue here that curriculum has also been driven by social and

economic factors. To support our claims, we have divided the history of academic IS into four eras: Founding & Growth (1968-1990); Glory Days (1991-2000); Decline & Fall (2001-2008); and Rebound (2009-present). We define the eras based on the number of MIS majors over the past five decades (Figure 1). These data closely reflect the trends seen in the numbers of Bachelor’s degrees conferred by U.S. postsecondary institutions for computer and information sciences (Figure 2). Starting with 1991, there is a slight dip in the numbers of both MIS majors and IS degrees awarded, and there is a sharp incline from around 1994 until 2000, where the numbers begin to drop off. Both graphs also show a decline from 2000 until 2008. In Figure 2, the total number of degrees in 2015-16 exceeds the Internet high of 2000, while in Figure 1, the number of MIS majors in 2019 is still short of the highpoint of 2000. Through these eras, we hold that the IS curriculum has emerged from the complex interaction of industry needs, economic conditions, and the realities of higher education.

The rest of the paper is organized as follows: First, we examine the four eras of academic IS history. Second, we examine curriculum in each era. Third, we show how the conditions in effect in each era affected the changes in curriculum. We end with reflections and a few comments on what the future might hold.



Figure 1. Three of the Four Eras of Academic IS History, Illustrated with MIS Majors Data

(Note: Real data collected from two similarly sized MIS programs at large, public universities. Each point represents the number of MIS majors in the program for that year. Double majors are not counted. Data from 1991 through 2010 are from one university; data from 2012 through 2019 are from the second university. Data from 2011 were missing and were extrapolated.)

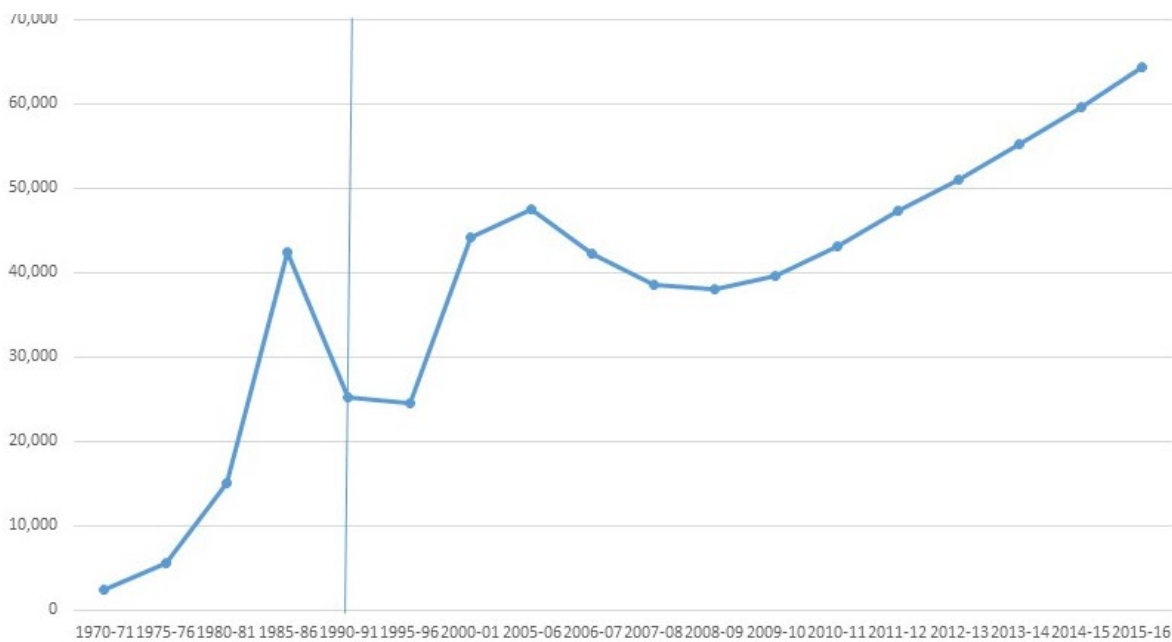


Figure 2. Bachelor's Degrees Conferred by U.S. Postsecondary Institutions for Computer and Information Sciences
(Source: U.S. Department of Education, National Center for Education Statistics)

2. FOUR ERAS OF ACADEMIC IS

2.1 Founding & Growth (1968-1990)

Before business schools began offering programs with a concentration in computing, businesses generally employed personnel with degrees in mathematics or engineering (Niederman, Ferratt, and Trauth, 2016). Eventually, business owners and managers began to see the need to employ people with both an interest in computing and a business background in order to better cater to their end users' needs (Ng Tye, Poon, and Burn, 1995). In turn, business schools began to heed the call for business-oriented computer professionals. The world's first undergraduate business information systems program was founded in 1963 at Mississippi State University by Charles Moore (Shim et al., 2015), followed closely behind by programs at Colorado State University and Georgia State University. Likewise, the first graduate programs in information systems were founded in 1967 by Gordon Davis, Gary Dickson, and Thomas Hoffman at the University of Minnesota (Zhang, 2016).

The early 1970s saw the formation of general courses that were incorporated by programs concentrating on information systems. Up to this point, the use of computers within business schools was primarily left to the interest level of the particular faculty member and often took the form of using computer-based procedures to complete class assignments (McKenney and Tonge, 1971). Some of the early pioneers in the field of IS felt that undergraduate programs should be structured around developing technical competencies (e.g., programming, finite math, statistics), with courses centered on the business context (e.g., organizational behavior, social implications, systems analysis) offered in graduate programs that students would realistically enter immediately following graduation (Ashenhurst, 1972). For example, Figure 3 shows the undergraduate IS curriculum at Mississippi State University (then referred to as "Business Data Processing") changed relatively little once the analytical courses were established, with programming and statistics embedded within virtually all of the coursework. Courses in economics, business law, and finance were then required for graduate students in the IS program.

The rise of IS degree programs in the 1970s also coincided with the decline of programs in operations research and management science (OR/MS). Before the advent of business computing, much of the data-driven decision-making fell upon

OR/MS professionals with experience in mathematical modelling. While it is difficult to assign causality to the changing enrollments of the two fields, anecdotal evidence suggests that students who would have ordinarily been interested in operations were swayed by the increased interest, job opportunities, and salaries in IS (Otondo, 2019).

As computing became more widespread in businesses, organizations turned to IS programs to hire MIS majors who had backgrounds in both business and technology. As demand for these graduates increased, new MIS departments were created, such as the MIS Department at the University of Arizona in 1974. As more and more departments were created, and as demand for graduates increased, colleges hired more and more IS faculty. Anecdotal evidence suggested that the ratio between IS faculty jobs available and IS faculty candidates was as high as 17-to-1 in the 1980s.

Following a 1979 survey of existing IS programs, the ACM Curriculum Committee issued a series of recommendations for undergraduate IS education (Nunamaker, Couger, and Davis, 1982). The report listed three major knowledge requirements for graduates: information systems technology, information systems concepts and processes, and organization functions and management. Coursework was recommended to focus on the interactions of those three areas, and a successful program should prepare graduates for entry level positions in systems analysis, application programming, and IS planning and administration. Prerequisite coursework included introductory computer programming and quantitative methods in addition to other business coursework. Core coursework included: computer architecture concepts, data structures, systems in organizations, database management, information analysis, data communications and networking, systems design, and a projects course.

The U.S. economy suffered a recession starting in July 1990 and ending in March 1991 that adversely affected impressions of the white-collar labor market, particularly among recent college graduates. During this time, downsizing was typically focused on middle management (Cameron, Freeman, and Mishra, 1991). Not only were IS managers among those being targeted for termination, the information technology they were responsible for advancing helped reorganize and streamline business processes in ways that made downsizing easier (Cascio, 1993; Pinsonneault and Kraemer, 1997). Unemployment rates during the recession ultimately reached 7.8% and likely added to lowered perceived employment

BSD 3713	Intro to Data Processing
BSD 3793	Senior Seminar
BSD 4533	Marketing Research
BSD 4723	Business Stats Using Computers
BSD 4733	Business Data Processing
BSD 4753	Business Decision Simulation
BSD 5563	Intro to Operations Research Models
BSD 5733	Data Processing Systems



BSD 2713	Electronic Information Systems
BSD 3793	Senior Seminar
BSD 4723	Business Stats Using Computers
BSD 4733	Business Data Processing
BSD 4753	Business Decision Simulation
BSD 5563	Intro to Operations Research Models
BSD 5733	Information Systems for Management

Course was discontinued

Figure 3. MIS Curriculum Changes at Mississippi State University from Fall 1969 to Fall 1989 (Source: Mississippi State University Library Special Collections)

opportunity costs, further contributing to declining enrollments (Wright, Ramdin, and Vásquez-Colina, 2013). Collegiate IS programs began to cut back on hiring as industry demand for their students plateaued or fell. For the first time since the academic field began, there were more faculty candidates than there were faculty positions.

2.2 Glory Days (1991-2000)

College students were noted as starting employment searches as early as their freshmen years (Farnham, 1993) and believed that the soft skills they would need were more available through participating in internships (Martin, 2013). This led to a renewed interest in fields recovering from the recession, like information systems. This era is also remembered as the “end user revolution” due to technological innovations that made end user computing “smaller, cheaper, and easier to use” (Niederman, Ferratt, and Trauth, 2016), in addition to the 1996 Telecommunications Act that allowed the Internet to become a public (and commercial) resource.

A model curriculum appropriate for the increased enrollments and changing technologies was conceived, starting with an ad hoc committee convened at the 1992 International Conference on Information Systems and eventually leading to a 1995 report approved by several hundred academics and IT professionals. The 1995 curriculum featured recommendations for expanding coursework on telecommunications, more team-oriented projects, and providing for local employer needs, as well as increased emphasis on globalization (Couger et al., 1995). The curriculum report also contained one of the more detailed discussions of what an information systems curriculum should contain and what attributes an IS program’s graduates should have upon program completion (Couger et al., 1995). Among the competencies described were communication skills, an understanding of how applications function within an organization, an appreciation for computer functions, managerial skills, problem-solving skills, an understanding of systems theory, an ability to develop or acquire software suitable for supporting business functions, professionalism, and ethical standards. As such, the undergraduate curriculum should be designed and evolve in ways to enhance these student attributes.

Meanwhile, in 1989, Tim Berners-Lee invented the World Wide Web, and the first browsers began to appear in the early 1990s, with Mosaic in 1993 and Internet Explorer in 1995. As the Web grew, it attracted the interest of entrepreneurs and venture capitalists. As the commercial use of the Web multiplied, and the dot.com bubble expanded, businesses began to dramatically increase their hiring of IS students. IS departments dramatically increased their faculty hiring to keep pace, and by 2000, the IS major was the largest in many business schools, eclipsing finance and accounting for the first time (and the last time?). The increasing interest in the Internet infrastructure and its implications for business motivated IS programs to add content on e-commerce to existing courses and to change existing programming classes from mainframe software development to web development. Though K-12 educators claimed that student experience with personal productivity software and with the Internet during high school provided worthwhile exposure to technology, IS researchers recommended that e-commerce education at the collegiate level would better prepare students for the global online business

environment (Fomin et al., 2003). Some business schools went to the length of adding programs specializing in e-commerce, though others found that adding a single course on the topic was satisfactory to meet the demand (Rob, 2003).

2.3 Decline & Fall (2001-2008)

However, the sunny days of high enrollments in IS programs were not to last. Despite a continual demand for IS workers by organizations worldwide, the supply of students to fill the demand dropped dramatically, with some programs reporting 70-80 percent declines in enrollment from their peaks in the late 1990s (Granger et al., 2007). Student interest in majoring in information systems tanked. A number of economic and social factors, all occurring within the first few years of the new millennium, are thought to have had an impact on how students viewed the field. Among these were the passing of the Y2K “crisis,” the bursting of the dot.com bubble, and news reports of offshoring IS jobs to overseas labor markets (Ives et al., 2002; Looney and Akbulut, 2007). Opinion pieces that suggested that there was no real competitive advantage gained from information systems investment (Carr, 2003) only added to a growing perception that the IS field was on the verge of extinction.

For most business organizations, investments in IS peaked during the run-up to the Y2K “Millennium Bug” which focused on potential problems involving two-digit date variables that were hard-coded into mission-critical legacy systems. The years of money and effort invested to prevent problems, once changing to the year 2000 could possibly populate those variables with a nonsensical “00” value, often meant that other investment needs within the organization were postponed (DeJarnett, Laskey, and Trainor, 2004). When the crisis failed to meet the expected doom, the investment efforts became the source of consternation and negative press. One analysis of the Y2K spending by firms showed that doing so ultimately led to their increased market valuation and improved earning performances in the aftermath (Anderson, Banker, and Ravindran, 2006). Unfortunately, news of positive effects of the non-event did not make much headway against beliefs that spending was unwise (Kong and Seipel, 2000).

New undergraduate curriculum guidelines were offered in 2002, having been motivated by three environmental factors: the widespread adoption of the Internet and e-Commerce, better computing preparation for incoming university students, and increasing interest in accreditation for IS programs in business schools. The updated curriculum called for new courses in IS strategy and personal productivity with technology and renewed emphasis on communication and team skills (Gorgone et al., 2003). While these recommendations were well-known among IS academics, the public at large was receiving contradictory advice. Some critics of information systems education began to claim that e-commerce was more a fad than anything permanent, to the point of mocking anything curriculum-related that started with an “e-” (Mitchell, 2000). The media also reported widespread accounts of American companies moving their IT-enabled services offshore to India, China, and the Philippines (Premji, 2005; Rutkoff, 2005).

One unfortunate consequence of the heavy coverage IT outsourcing received was the spread of misconceptions about the IT job market and the desirability of degrees in IS. In an early examination of the offshoring movement, Hirschheim et

al. (2005) documented the decline in enrollment for undergraduate computer-centric degrees, despite projections from the Department of Labor Statistics at the time that the demand for technology workers would outpace the supply. Granger et al. (2007) detailed several of these, including the belief among students that there were currently no jobs available in IT, there would be no IT jobs in the future, what IT jobs that existed would see reductions in salaries due to overseas competition, and that IT degrees were worthless. Granger and colleagues offered curriculum-based responses to these challenges, such as the establishment of certificate programs, cross-disciplinary degrees, and course offerings that would be feasible for students interested in a minor. In order to better prepare students for the new reality of offshored entry positions, they recommended that IS programs should incorporate project management and international cultural content into their curricula.

2.3.1 2008 recession / state budget cuts. The 2008 economic recession had major impacts on IT education, starting with the slowing of revenue collected by the individual states which resulted in reduced disbursements to state universities. Faculty salaries stagnated, scholarship funds were cut, and grant opportunities decreased, but at some universities even more dramatic decisions were carried out. In 2009, the University of Central Florida eliminated four degree programs, including the MIS program within their College of Business Administration, to save \$4 million dollars for the university's academic budget (Opinion, 2010). Overall, 45 UCF faculty lost their jobs, and students who were majoring in MIS complained that the course sequence was so tightly scheduled that the elimination process timeline would prevent them from graduating (Weber and Zaragoza, 2009). Other universities enacted furloughs and froze new faculty hires, despite the fact that IT professionals were crying out for an increase in qualified graduates (Shah, 2016). It may not be possible to know the degree to which the economic downturn disrupted the field and stunted the growth of IS degree programs.

2.3.2 Misconceptions about the job market. Prescriptions for combatting the negative press and for putting the field's best foot forward came from all corners, and recommendations for better utilizing the curriculum were often part of an overall plan for recovery. George, Valacich, and Valor (2005) highlighted the strategic importance of the introductory information systems course that all students majoring in business disciplines are required to take. By making the course content more relevant (and even exciting) to all business majors, students with an interest in computing might consider switching to the IS major or at least consider a minor in IS. Looney and Akbulut (2007) tested this notion with a survey of intro students and found that assigning the course to an effective, enthusiastic instructor who could make the course material interesting could lead students to re-evaluate their career choices.

Given the number of economic and social changes that occurred during the downturn era, IS faculty and department chairs across the country made major changes to their curriculum. Programming courses were often culled in favor of courses that were less technical and more managerial in nature. Apigian and Gambill (2010) found that COBOL was the most frequently eliminated programming course between 2003 and

2010, and 24% of the IS programs they examined opted to offer "programming concepts" courses designed to teach basic fundamentals rather than a specific language. For example, Figure 4 displays the curricula offered by the MIS program at the University of Arizona both before the downturn and at the end of the era.

2.4 Rebound (2009-Present)

Even as bleak as things seemed for the academic IS field during the Great Recession of 2007-2008, the IT industry was actually experiencing a strong recovery. Academic IS programs hit bottom around 2008 and then began a slow recovery. Industry recruiters showed up again on college campuses; colleges created new lines for IS faculty – just a few at first but increasingly more over time. The numbers of MIS majors began to grow again, and over time, they returned to respectable totals. The global recovery from the Great Recession accelerated this growth.

The Association for Information Systems released an updated (and according to the report's authors, long overdue) model curriculum in 2010 (Topi et al., 2010). Among the reasons given for revising the curriculum were not only innovations in system architectures and maturing Web technologies, but economic and social changes as well. Specifically, the increased preponderance of globally-distributed work teams and the dependency on ubiquitous mobile computing were influential for recommended additions in infrastructure instructions and eliminations of personal productivity courses. Additionally, the report's authors noted IS program enrollment declines over the previous decade and, as a result, the frequency with which organizations in emerging economies were returning to hiring engineering students as opposed to graduates from business schools. Thus, IS faculty and advisory boards were asked to give serious thought to revisiting their coursework to better address the changing times.

2.4.1 Baby Boomer retirements. The demand for more students majoring in IS was compounded by the retirement of professionals born between 1946 and 1964, commonly known as the "Baby Boomer" generation. While the mass retirement of the largest population cohort in the United States will have a major turnover impact in all industries, it is expected to be especially challenging for the information systems sector. A significant number of legacy systems and processes were developed by Baby Boomers, and as they retire, the knowledge they accrued over a lifetime of experience leaves with them, requiring a smaller subset of younger workers to pick up the slack (Petter and Ward, 2015). An analysis of IS practitioner journals found that current professionals believe that students show insufficient interest in gaining mainframe programming skills and legacy system maintenance skills, and there is inadequate coverage of these topics within university coursework (Huang et al., 2009).

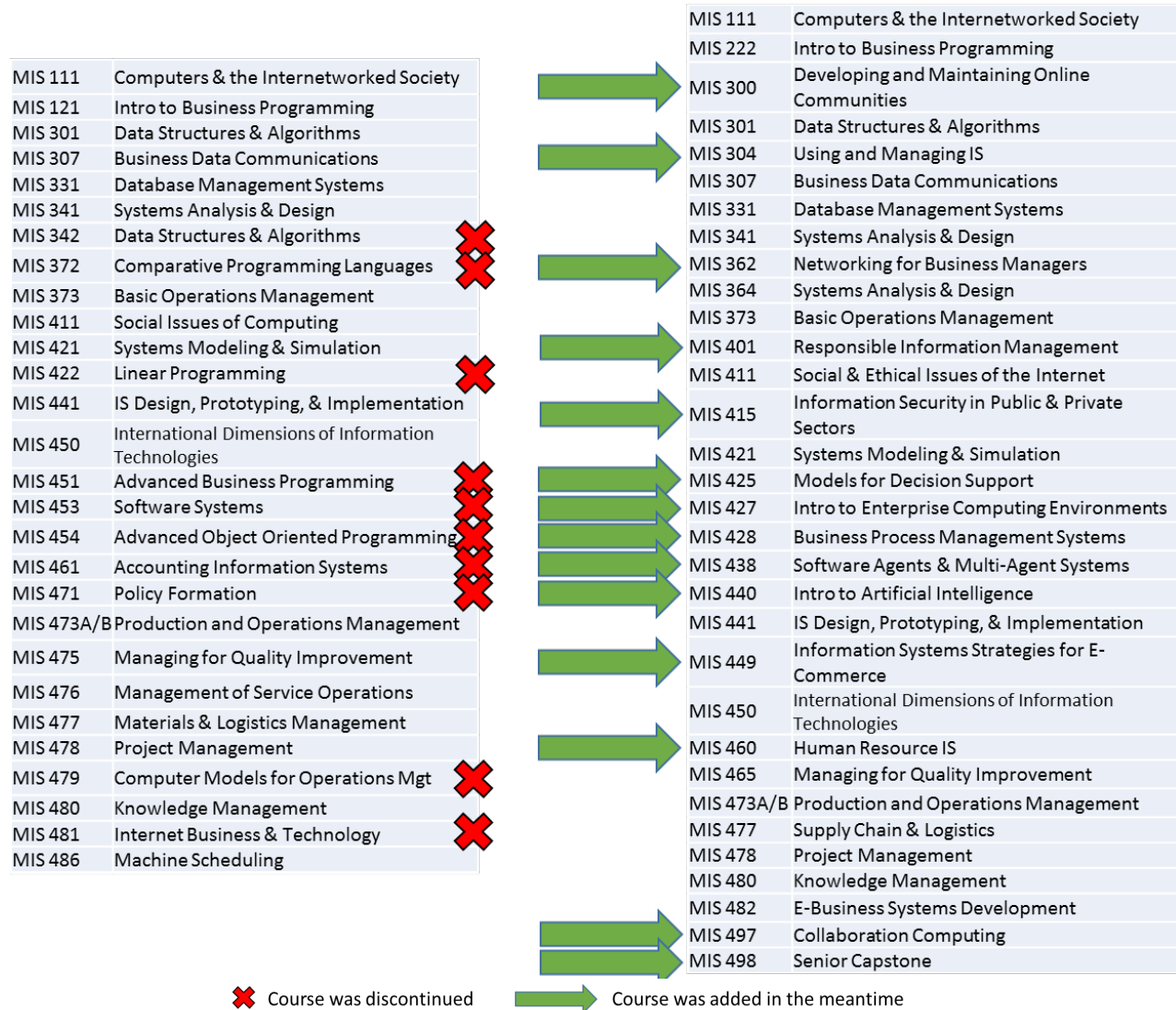


Figure 4. MIS Curriculum Changes at the University of Arizona from Fall 1999 to Fall 2008
(Source: University of Arizona Academic Catalog Archive)

2.4.2 New industry demands and career paths. Niederman, Ferratt, and Trauth (2016) made predictions regarding trends that would necessarily cause IS degree programs to re-evaluate their offerings through the next decade. Their predictions generally revolve around changing knowledge, skills, and abilities (KSAs), easier access to information technology, innovative systems and applications, and an expanding range of jobs requiring IS expertise. This includes soft skills development necessary for global teamwork, such as the integration of foreign language requirements and multicultural communication into IS coursework (Mitchell and Benyon, 2018).

One example of a trend within the IS community to meet anticipated shortages in a rising career track is the increasing numbers of undergraduate programs that have begun offering data analytics as a standalone course or have incorporated data science into existing courses (Mills, Chudoba, and Olsen,

2016). Similarly, a greater demand for health information professionals and the emergence of innovations in the health sector has led to calls for new courses covering health informatics in IS degree programs (Hunt, Panigrahi, and Momenipour, 2015).

Other earlier trends in information systems appear to be changing in terms of influence on perceptions of IS careers. For instance, the process of offshoring was said to be mature and accepted to such a degree that the term *offshoring* itself has morphed into “global IS resourcing” or “multi-shore consulting” (Gannon, Wilson, and Powell, 2014).

Recent research has investigated the reasons why (or why not) incoming college students choose to major in information systems, and it identifies some of the same reasons as studies in previous decades: students report a lack of interest in the major, and students believe that IS programs require technical skills they do not possess (Chipidza, Green, and Riemenschneider,

Pre-2003	2007	2009	2010-2019
C	Intro to Internet Tech	MANDATED	MANDATED
COBOL	Advanced App Dev	SAD	SAD
Advanced App Dev	SAD	Database	Database
C++	DSS & Expert Systems	Telecomm	Telecomm
Foundations of IS	Database	MANAGERIAL TRACK	CHOOSE 3:
SAD	Telecomm	DSS & Expert Systems	C++
DSS & Expert Systems	Tech Management	Tech Management	C
Database	Project Management	Project Management	Java
Telecomm		TECHNICAL TRACK	Advanced App Dev
Tech Management		Advanced App Dev	Programming I
		Java	DSS & Expert Systems
10 courses required; 4 programming	10 courses required; 2 programming; 2 electives	6 courses required; 3 electives in 1 of 2 tracks	Tech Management Project Management Mobile Technology Special Topics
			6 courses required; 3 electives – at least 1 programming

Figure 5. MIS Curriculum Changes at Florida State University from 2003 to 2019

2019). One report examining IS career paths paralleled these student feelings by concluding that future graduates will likely filter into one of two bifurcated roles: “tech specialists” and “business specialists” based on their personal interests and expected contributions to their future employers (King, 2010). Accordingly, many IS programs have begun structuring coursework toward particular career paths and are allowing students more flexibility in terms of planning their programs of study. For instance, Figure 5 shows the changes made to the IS program at Florida State University in order to provide students with more desirable coursework.

3. DISCUSSION

The goal of this paper was to review to the history of curricula across undergraduate programs in information systems and to examine how social and economic factors affected curriculum changes. Certainly, the introduction of new technologies and platforms inevitably require changes to be made to course content, if not the program of courses themselves. However, changes in technology and the resulting changes in what industry needs from employees are but two of the factors that affect changes in curriculum. Our point is that changes in technology and business needs are insufficient to explain all of the curriculum changes we have seen in the past 50 years. Environmental conditions – social and economic factors – that are uncontrollable and, often, unforeseen have been highly influential in the past and can be expected to be so in the future. To summarize our review, we highlight three specific circumstances below.

First, economic conditions in the U.S. facilitated changes to IS programs, perhaps none more than the opening of the Internet for commercial transactions and the evolving business processes that resulted. The advent of the World Wide Web and

its potential for commercialization affected the growth of the IS field and changed the IS curriculum in higher education like nothing before or since. The promise of e-commerce and the rapid expansion of the U.S. economy that resulted led to the tripling of the numbers of MIS majors in less than seven years and also led to the rapid development of e-commerce curricula, Masters’ degrees, and centers. The field of IS played a central role in expanding business marketplaces into the online environment, which in turn led to the demand for more MIS majors and more MIS faculty (earning higher salaries) and more academic degrees in e-commerce.

Second, the dot-com bubble, coupled with a rapid and very public expansion of outsourcing led to a fast downturn in enrollment in MIS programs. The next seven years witnessed a decline in the number of MIS majors that was more rapid than the preceding expansion. MIS programs contracted, and when faculty retired or otherwise left an MIS department, the empty faculty line went to some other department in the university. Often, MIS programs were merged into other departments. There were fewer MIS majors in 2008 than there had been in 1993, when the expansion started. The advent of the Great Recession in 2007 and 2008 did not help. This period stands as a prime example of how the interaction of economic and social factors can influence changes in IS curricula. MIS faculty throughout the U.S. worked feverishly to change their curricula, to rebrand MIS, and to make it less technical and more managerial as a way to attract students back to the major, as we have previously demonstrated. Programming requirements were reduced, and in some cases, eliminated altogether. Note how the major requirements at Florida State University went from four required programming courses in 2003 to two in 2007 and none in 2009 (Figure 5). Clearly, industry was not demanding that MIS majors stop studying programming, and changes in technology had not eliminated the need for

technically oriented skills. These changes were made in part as a way to attract students back to the IS major. Social and economic conditions became key drivers.

Since 2008, when MIS turned the corner again, growth in MIS majors has been steadily increasing, as Figures 1 and 2 illustrate. As a reaction to this growth, the market for MIS faculty has been exceptional over the past several years. MIS majors, and MIS faculty, are once again in high demand. What's been driving the latest expansion? We again see a confluence of industry and social and economic factors. While there are many growth areas related to MIS in industry, a major focus has been the need for data scientists and anyone else who can help industry with their Big Data processing and visualization needs. Socially, there is a fear of data and identity theft, as hackers have engaged in large and well-publicized data breaches, capturing the attention of the public and leading to demands for better data stewardship and for expanding cybersecurity efforts. Meanwhile, the economy has been growing steadily since the end of the Great Recession. The core curriculum in MIS has stabilized, and programs have added courses, majors, certificates, and Masters' degrees in business analytics and cybersecurity.

4. WHAT ABOUT THE FUTURE?

Current trends suggest that IS programs are configuring courses of study around potential career paths and concentrations. These concentrations include multiple courses in areas like data analytics, health informatics, social media, and information security. As discussed earlier, previous efforts to introduce concentrations and specializations at one time included e-commerce and website development. It remains to be seen whether the present-day concentrations will have more staying power than those earlier examples.

One possible glimpse into the future reveals a competition between tech companies and universities, both attempting to attract students into the field. Recruiting attempts are occurring earlier during students' academic careers, even starting in junior high or high schools. Coding camps are financially supported and staffed by the technology firms themselves and may not only stimulate interest in future IS students but also complement programming fundamental courses taught at the college level.

It should be noted that the degree to which universities adhere to model curriculum guidelines varies widely, but an analysis of the adherence levels following the 2010 model release indicates that the percentage of IS programs that offer recommended courses was significantly larger than seen with previous models (Bell, Mills, and Fadel, 2013). This increase was particularly noticeable for recommended coursework in foundational courses and for data management.

One thing that does seem clear about the future is that information technology will continue to change rapidly. MIS curricula will also continue to evolve, driven not only by IT but also by industry needs, social conditions, and economic circumstances. Today's MIS programs and curricula would have been unrecognizable to those who started the first academic MIS programs in the 1960s and to the founders of *JISE* just 30 years ago. What things will look like 50, or even 30, years from now is impossible to predict, but we can

guarantee that a host of factors – and not just technology – will determine the road we take to get there.

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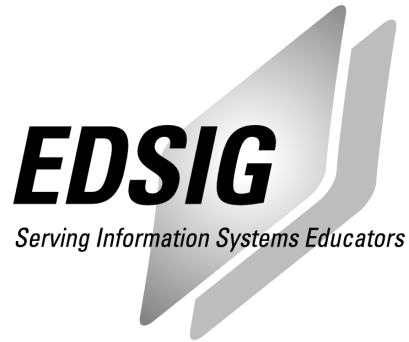
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