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FACULTY PERSPECTIVES ON THE INFORMATION TECHNOLOGY AND ANALYTICS REQUIREMENTS OF BUSINESS STUDENTS

Mark Sena, Xavier University, sena@xavier.edu
Elaine Crable, Xavier University, crable@xavier.edu
James Brodzinski, Valparaiso University, jim.brodzinski@valpo.edu

ABSTRACT

In order to prepare students to meet the challenges of today's business world, students need to have greater skills in information technology and business analytics. However, business schools have a limited number of credit hours that can be required of students. As a result, committees and task forces that evaluate these requirements have difficult decisions to make. This study examines the number of credit hours that faculty believe should be required of various course work, focusing in particular on comparing the information technology and analytics requirements against those of other content areas. The authors collected 204 survey responses from business faculty representing 20 AACSB accredited universities. The analysis of the results summarizes varying perceptions of the number of credit hours that faculty believe should be required of topics ranging from business analytics, computer programming, Excel and Calculus to those of oral and written communication, human resources, project management, business ethics, and plus other core topics. We also compare differences in perceptions across faculty by business disciplines and by job titles and examine the correlation among the credit hour requirements to explore which requirements tend to be aligned with one another.

Keywords: Curriculum Requirements, Information Systems, Business Analytics, Computer Programming.

INTRODUCTION

Every business school's goal is to prepare students to meet the challenges of today's business world. Business is the largest undergraduate major in the United States and growing. This reality, along with the immense power of the business sector and its significance for national and global well-being, makes quality education critical (Colby, Ehrlich, Sullivan, and Dolle, J.R., 2011). Business education will be limited if it only focuses on teaching theories and practices of the past, so to avoid this, colleges regularly revisit their curriculum to ascertain its overall value. Curriculum designers use a variety of sources to identify the most current content. One technique is to consider the guidance provided by accrediting groups such as AACSB (Association to Advance Collegiate Schools of Business) and ACBSP (Accreditation Council for Business Schools and Programs); while another is to interview business executives and faculty. Additionally, alumni surveys can provide information for determining the core curriculum that best meets the needs of business. Business school faculty are continuously in pursuit of the best core of study for our students as they focus on building business skills along with critical thinking skills.

There are two schools of thought on the basic approach to developing the content of the basic business core. "Reformers," critics of the traditional business school model, believe that there is too much scientific rigor and too little practical relevance in the curriculum; "Traditionalists" defend a strong theoretical and scientific model content (Pfeffer and Fong, 2002). The question for both schools is what should be taught in a business core curriculum?

The "Traditionalists" focus on defending theoretically rigorous scholarship and claim that this scholarship is what will make students successful in business due to the evidence-based teaching it drives in the classroom. Traditionalists believe that it is important to move away from the "relevant trade school" model of the 1950s-post-war era toward a scientific model of inquiry when teaching students business (Khurana, 2007) and critical thinking (Steedle, and Bradley, 2014).

The "Reformers" believe that business school graduates see little connection between what is taught in business schools and what is important to be successful in business. Mintzberg (2004) stated that conventional business programs train the wrong people in the wrong way resulting in the wrong consequences. He asserted that often business programs produce functional specialists instead of people who can grow to be managers. Reform oriented followers agree that effective business education consists of teaching relevant business skills. Cabera (2003) says that managers must be responsive thinkers who are able to collaborate to find solutions to complex business and social problems. Traditionalists believe that students who have been exposed to the scientific method and rigorous theoretical arguments will be able to come up with the 'right answer' (Peng and Dess, 2010).

This paper poses this same question to business faculty and administrators, "what should be taught in the business core?"

Technology Skill Demands

The basic business core question is confounded by the growing demand for tech skills in college graduates moving into the modern workforce. Given the limited number of courses that comprise the business core, business schools now are being asked to allocate time for curriculum content that incorporates technology and analytical skills in addition to the standard business-core content. Over the past few years there has been an increasing demand for analytical skills, exemplified by the significant enrollment growth in business analytic majors and minors. Horsley noted this change in 2009 when he observed the need for "hard" skills (such as finance, technology, statistics) in the business curriculum to meet the needs of current business. Simultaneously there has been a growing need for course work embodying "soft" skills such as communication, team, and management skills.

Accompanying this increasing demand for analytical courses is a renewed interest in computer coding – this as a result of initiatives such as Obama's Computer Science for All (Guzdial, 2016) and Google's Code Next (Thomas, 2016). These initiatives were created to enhance the competitiveness of the United States. Moreover, for over three decades it has been known that learning to code will enhance critical thinking and problem-solving skills (Berger and Pezdek, 1987), all necessary skills for a successful business career. Information Systems Technology is a also key component in today's business infrastructures with innovative applications fueling competitive advantage. With this fact, we see that information systems education should be a critical element in business schools' programs today to appropriately prepare students to enter the workforce (Fustos, Morris, and Haga, 2017).

While these technical skills are clearly valuable, faculty and administrator who assess requirements for business school graduates have difficult choices to make. There is a necessity to maintain a stable core body of knowledge in any business program, such as Economics, Accounting, Marketing, Finance, and numerous Management related courses. However, in addition to these basic business course requirements, programs now must consider how to meet the technology demands of today's business with the limited number of required course hours available in business programs. Faculty committees that are considering changes in business curricula now have to weigh the relative value of coursework in technology and business analytics against subjects ranging from oral communications to marketing and calculus.

In order to provide a partial answer to the question posed earlier, "What should be taught in the business core," this study examines the perceptions of faculty who make credit hour decisions for these technology skills relative to various other potential subjects. Faculty surveyed were asked to weigh the importance of a variety of course content, beyond the basic business core courses, that would potentially be competing for credit hours in their Business core. The survey asked faculty to assign mean credit hours to a variety of business subjects to discover the average mean credit hours for business analytics, Excel and computer programming, versus other subjects such as calculus, international business, communications, etc.)

RESEARCH METHODOLOGY

This research determined to answer the following five questions:

1. Do the mean values of recommended credit hours for computer programming, spreadsheets, and business analytics vary from those of other subjects?
2. What percentage of respondents believe that various subject courses should be offered for a given number of credit hours? (e.g., What percentage of respondent believe business analytics should have 0 hours required?, 1 hour?, 3 hours? More than 4 hours?)
3. Do mean recommended credit hours for various subjects vary based on the department of the respondent?
4. Do mean recommended credit hours for various subjects vary based on the tenure status (untenured, tenured) of the respondent?
5. Which course subjects are correlated in terms of variance of credit hour recommendations?

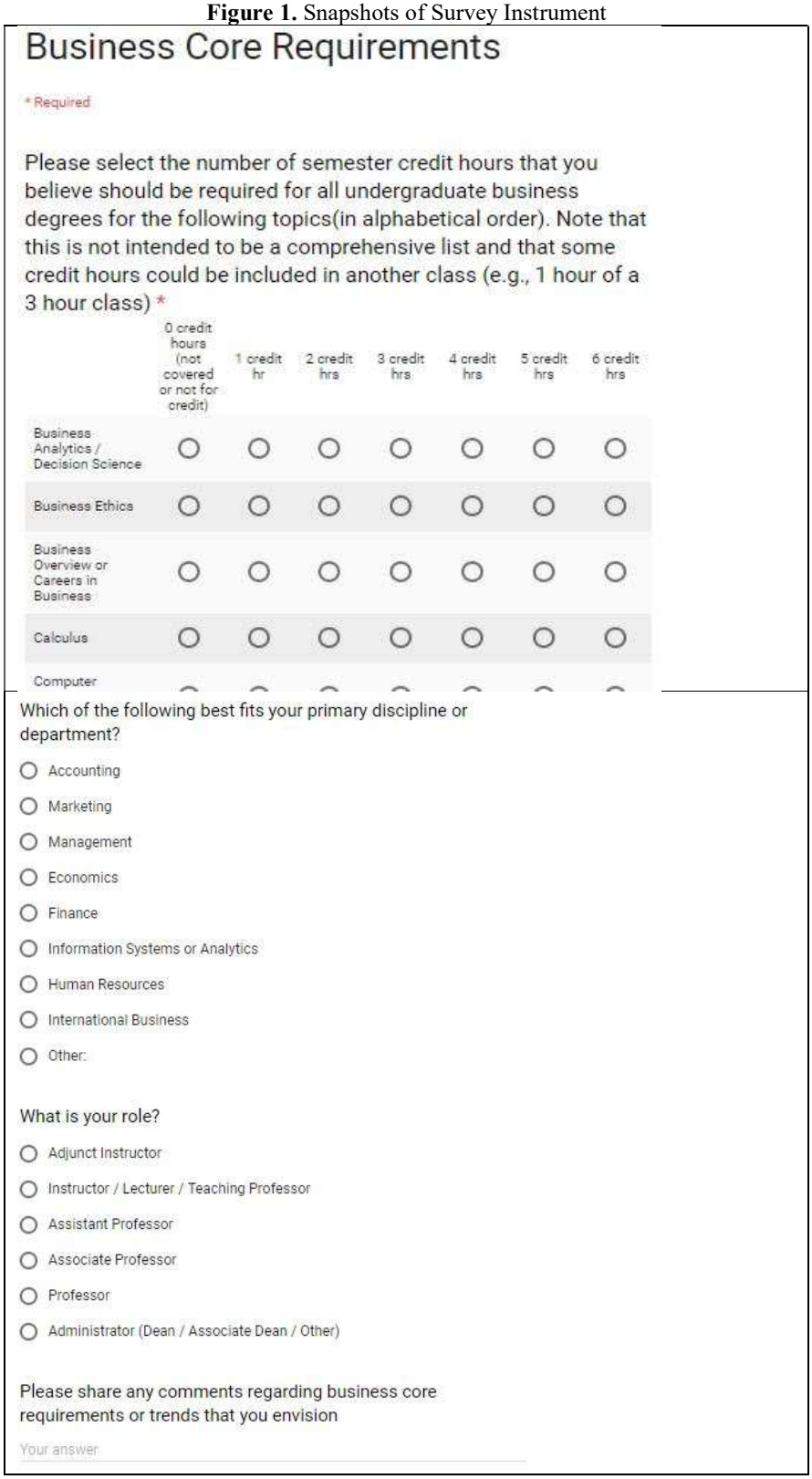
To measure these results, an online survey instrument (see Figure 1) was developed. The survey instrument listed the subjects alphabetically with radio buttons where respondents were able to select from 0 (not offered) up to 6 credit hours per subject. An email with a link to the survey instrument was sent to 1,770 business school faculty. Prospective subjects were identified from public web sites that were listed on the AACSB accreditation home page. The email message contained a brief description of that the purpose of the study was to examine required credit hours for possible subjects required for business students. In order to minimize possible non-response bias, the message did not reveal that business analytics and information technology subjects were of particular interest and did not reveal the department of the corresponding author. The subject pool included representation from 20 American universities that were selected alphabetically from the AACSB site. Survey invitations with a survey link were sent via email to all business school department faculty at the targeted universities (all departments and types of instructors were included, but job titles indicating secretarial or administrative assistant duties were manually removed). After subtracting 41 addresses that were undeliverable or set to out-of-office auto-reply, 204 completed responses were obtained with a resulting response rate of approximately 12%. The demographic roles and departments of the respondents are indicated in Table 1.

Table 1. Demographics

	Characteristic	Number of Responses
Role	Adjunct Instructor	10
	Administrator (Dean / Associate Dean / Other)	12
	Assistant Professor	40
	Associate Professor	59
	Instructor / Lecturer / Teaching Professor	24
	Professor	57
Department	Accounting	31
	Economics	20
	Finance	19
	Information Systems or Analytics	23
	Management	49
	Marketing	33

Note: excludes roles or departments with fewer than 10 responses

Figure 1. Snapshots of Survey Instrument



Business Core Requirements

* Required

Please select the number of semester credit hours that you believe should be required for all undergraduate business degrees for the following topics(in alphabetical order). Note that this is not intended to be a comprehensive list and that some credit hours could be included in another class (e.g., 1 hour of a 3 hour class) *

	0 credit hours (not covered or not for credit)	1 credit hr	2 credit hrs	3 credit hrs	4 credit hrs	5 credit hrs	6 credit hrs
Business Analytics / Decision Science	○	○	○	○	○	○	○
Business Ethics	○	○	○	○	○	○	○
Business Overview or Careers in Business	○	○	○	○	○	○	○
Calculus	○	○	○	○	○	○	○
Computer	○	○	○	○	○	○	○

Which of the following best fits your primary discipline or department?

- ○ Accounting
- ○ Marketing
- ○ Management
- ○ Economics
- ○ Finance
- ○ Information Systems or Analytics
- ○ Human Resources
- ○ International Business
- ○ Other:

What is your role?

- ○ Adjunct Instructor
- ○ Instructor / Lecturer / Teaching Professor
- ○ Assistant Professor
- ○ Associate Professor
- ○ Professor
- ○ Administrator (Dean / Associate Dean / Other)

Please share any comments regarding business core requirements or trends that you envision

Your answer

RESULTS

The results are presented in order of the research questions.

1. Do the mean values of recommended credit hours for computer programming, spreadsheets, and business analytics vary from those of other subjects?

   As illustrated in Table 2, there was strong support for business analytics requirements with the greatest overall average of 3.6 credit hours recommended by respondents. The subjects related to information technology received less support with an average of 2.37 recommended for Excel and 1.84 hours for computer programming. By comparison, business overview or careers in business received an average of only 1.37 hours while statistics received the second highest average at 3.25. It is also interesting to note that the "soft" skill, "written communication" garnered the third largest number of recommended credits by the respondents.

Table 2. Mean Credit Hours Recommended by Subject

Subject	**Mean**	**Std D**
Business Analytics / Decision Science (BA)	3.60	1.49
Statistics (STAT)	3.25	1.34
Written Communications (WC)	3.03	1.23
Operations Management (OM)	2.64	1.69
Oral Communications (OC)	2.60	1.62
Business Ethics (BE)	2.46	1.62
International Business (IB)	2.41	1.29
Excel / Spreadsheets (EX)	2.37	1.23
Human Resources (HR)	2.16	1.11
Project Management (PM)	2.14	1.64
Calculus (CALC)	*1.98*	1.34
Computer Programming / Coding (CP)	*1.84*	1.37
Business Overview or Careers in Business (BO/C)	*1.37*	1.71

2.1 What percentage of respondents believe that various subject courses should be offered for zero credit?

The percentage of respondents who assigned specific credit hour ranges for the subjects are included in Table 3. Among the notable results, as shown in the first column of the table, very few respondents felt that zero credit hours should be devoted to business analytics (2.1%) and Excel (9.3%). By contrast nearly a third of respondents (32.6%) felt that computer programming skills should not be required at all. Interestingly, the same number (32.6%) also believe that Calculus should not be required of business students.

2.2. What percentage of respondents believe that various subject courses should have one credit hour?

The second column of Table 3 shows that 27.5% of respondents felt that one-hour of required credit for Excel would be sufficient while 12.4% recommended one-hour of credit for computer programming. Only 3.1% of respondents recommended a requirement of just one-hour of Business Analytics.

Table 3. Percentage Recommending Selected Requirements

Subject	% 0 Hrs.	% 1 Hr.	% 3 Hrs.	% 4+ Hrs.
Business Analytics / Decision Science (BA)	2.1	3.1	54.9	32.1
Business Ethics (BE)	4.7	23.3	47.2	9.8
Business Overview or Careers in Business (BO/C)	24.9	40.9	18.1	3.6
Calculus (CALC)	32.6	10.4	37.3	10.9
Computer Programming / Coding (CP)	32.6	12.4	33.2	10.4
Excel / Spreadsheets (EX)	9.3	27.5	34.2	14.0
Human Resources (HR)	14.5	16.6	49.7	5.2
International Business (IB)	8.3	15.0	54.9	6.7
Operations Management (OM)	5.7	9.3	66.3	7.3
Oral Communications (OC)	6.7	20.2	33.7	16.6
Project Management (PM)	13.0	20.2	38.3	8.8
Statistics (STAT)	2.1	5.2	58.5	21.8
Written Communications (WC)	5.7	12.4	36.3	26.4

2.3 What percentage of respondents believe that various subject courses should have three credit hours required? More than three credit hours? More than four credit hours?

Table 3 columns 3 and 4 illustrate that a majority of respondents believe that a minimum of a three-credit hour course in analytics should be required with 54.9% recommending three credit hours and 32.1% recommending 4 or more credit hours. Roughly a third of respondents felt that Excel (34.2%) and computer programming (33.2%) warranted three credit hours and a few recommended four hours or more to those subjects. The table also shows that while business analytics is perceived to be of great importance, various other subjects are valued at a higher or similar level when compared to Excel and computer programming.

3 Do mean recommended credit hours for various subjects vary based on the department of the respondent?

The differences in perspectives among different departments (subject areas) are reported in Table 4. Faculty who have served on committees to recommend changes in core curriculum have to consider the potential biases and/or foundational requirements for particular disciplines. The results shown in Table 4 reflect that Economics faculty have stronger support for quantitative requirements, including Business Analytics, Statistics, Calculus, and Computer Programming. Accounting and Finance faculty have higher mean values for Excel and Written Communications. Information Systems and Analytics faculty have lower mean values for Human Resources, International Business, and Oral and Written Communications.

4 Do mean recommended credit hours for various subjects vary based on the tenure status (untenured, tenured) of the respondent?

The differences in perspectives between tenured and non-tenured faculty is shown in Table 5. Interestingly, tenured faculty have lower required hour recommendations for most subjects as compared to non-tenured faculty (including assistant professors, instructors, and lecturers) who are less likely to have served on committees that recommend changes to core requirements. Perhaps tenured faculty are more aware of the trade-offs that need to be considered or are more inclined to reserve hours for major requirements or electives. On the other hand, untenured faculty may be more in tune with emerging industry trends and their perspectives may offer insights into the subjects that they perceive to be more important to current business needs.

Table 4. Mean Subject Credit Hours Recommended by Department of Respondent

Department	BA	BE	BO/C	CALC	CP	EX	HR	IB	OM	OC	PM	STAT	WC
Accounting	3.8	2.4	1.4	1.7	2.0	3.0	1.9	2.1	2.8	2.8	1.9	3.1	3.4
Economics	4.2	2.7	1.2	3.6	3.3	2.7	2.0	2.9	3.1	3.0	2.4	4.2	3.3
Finance	3.6	2.2	1.4	2.2	2.1	2.9	*1.7*	2.3	2.8	2.3	2.1	3.5	3.4
Info Systems or Analytics	3.5	2.0	1.3	2.0	1.9	2.0	*1.7*	*1.9*	2.5	*2.2*	2.1	3.0	*2.3*
Management	3.4	2.8	1.5	*1.3*	*1.2*	*1.9*	2.7	2.6	2.5	2.6	2.1	3.0	3.0
Marketing	3.6	2.3	1.3	2.0	1.6	2.2	2.1	2.6	*2.2*	2.6	2.2	3.7	3.2

Table 5. Mean Subject Credit Hours Recommended by Tenured Faculty vs Other Instructors

Job Title	BA	BE	BO/C	CALC	CP	EX	HR	IB	OM	OC	PM	STAT	WC
Others	3.9	2.7	1.7	2.1	2.2	2.9	2.6	2.5	2.9	3.1	2.5	3.1	3.4
Tenured Faculty	3.4	2.3	1.1	1.9	1.6	2.1	1.9	2.4	2.5	2.3	1.9	3.3	2.8

Note: Tenured Faculty includes Associate Professors, Professors, Deans and Associate Deans

5 Which course subjects are correlated in terms of variance of credit hour recommendations?

The correlation among the credit hour recommendations of the subjects are presented in Table 6. The results show that business analytics tends to be strongly related to computer programming and Excel but less strongly correlated with calculus or international business. Computer programming tends to be correlated with Excel and operations management but not with written communications. The results also show other topics such as oral communications, written communications, and project management to be strongly correlated with one another.

Table 6. Correlation (R) Between Subject Credit Hours Recommended

Subject	BA	BE	BO/C	CALC	CP	EX	HR	IB	OM	OC	PM	STAT	WC
Business Analytics / Decision Science (BA)													
Business Ethics (BE)	0.20												
Business Overview or Careers in Business (BO/C)	0.20	0.36											
Calculus (CALC)	0.15	0.09	-0.02										
Computer Programming / Coding (CP)	**0.44**	0.13	0.09	**0.43**									
Excel / Spreadsheets (EX)	0.39	0.19	0.32	0.08	0.33								
Human Resources (HR)	0.21	0.24	0.16	0.07	0.24	0.20							
International Business (IB)	0.18	0.36	0.34	0.20	0.27	0.26	0.34						
Operations Management (OM)	0.30	0.27	0.17	0.26	0.38	0.32	0.31	0.34					
Oral Communications (OC)	0.38	0.31	0.35	0.09	0.22	0.38	0.24	0.21	0.36				
Project Management (PM)	0.30	0.25	0.29	-0.05	0.25	0.38	0.37	0.27	0.39	**0.52**			
Statistics (STAT)	0.27	0.05	0.00	0.26	0.28	0.23	0.09	0.10	0.25	0.20	0.18		
Written Communications (WC)	0.39	0.23	0.32	0.09	0.18	0.38	0.25	0.21	0.30	**0.70**	**0.47**	0.29	

CONCLUSION

This study found that faculty place a strong emphasis on the value of Analytics when preparing business students. Regardless of discipline and rank the faculty are aware that in a contemporary business environment knowledge of analytics is important for a successful career. Following the analytics area, faculty emphasized the need for students to be prepared in communication skills and also supported a three-credit hour spreadsheet course.

Faculty had less support for courses involving business overview, calculus, and computer programming. Even though calculus continues to hold a three-credit hour place in most business core, surveyed faculty questioned its value. Some

commented that it is an important bar for students to hurdle in order to prove that they can be successful with the rest of the business core but that the content had little value as a prerequisite to other courses in the curriculum. Actually, 33% of faculty surveyed supported dropping the calculus requirement from the core.

Not surprising, there were differences in perspective across departments. Economic faculty supported quantitative courses and calculus in particular. Management faculty strongly supported human resource courses. Information systems faculty indicated less support for human resources, oral communications, and international business. Untenured faculty had greater mean hours for all subjects except statistics and calculus when compared to tenured faculty.

In conclusion, we feel that committees and administrators that are evaluating core curriculum requirements for business students should strongly consider adding business analytics to their curriculum while preserving requirements in statistics. They should also recognize the need to emphasize written and oral communications skills throughout the curriculum. We also conclude that spreadsheet skills are widely needed and should be required as a foundation skill. While the results of the study do not allow us to conclude that computer programming is widely recognized as necessary requirement, we recommend that it be considered along with subjects such as calculus as method of building logical and critical thinking skills. We also conclude, based on the variations in the responses and comments received, that there remains a blend of instructors who promote reform and others who hold on to traditional ideas.

Faculty and administrators have an obligation to offer students the skills they need to be successful, particularly in the areas of information technology and analytics. However, as this study shows, there are other valued subjects and varying opinions among different groups that make it difficult to implement change. This study serves as a foundation for discussion among groups that are evaluating requirements of business students and for future academic research on this important topic.

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