

A Comparison of Information Systems Programmes Taught to Undergraduates at Saudi Arabian Colleges

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Abstract—This paper presents a comparison of information systems (IS) programmes taught to undergraduates at 20 Saudi Arabian colleges. The colleges were divided into two groups: one group of 10 colleges and programmes focused on management information systems (MIS) and another group of 10 colleges and programmes on computerized information systems (CIS). Despite a shared core focus on IS, the two programme types differ in terms of where they are taught (at either business or science colleges) and the types of courses they offer. Regardless of type, all programmes tend to be internationally accredited. Programmes of the first type seek accreditation from the Accreditation Board for Engineering and Technology (ABET), whereas programmes of the second type seek accreditation from the Association to Advance Collegiate Schools of Business (AACSB).

Index Terms— Information Systems (IS), Curriculum Comparison, ABET, AACSB, Accreditation, IS Environment, IS Specialisation.

I. INTRODUCTION

Historically, the discipline of information systems (IS) began as a standalone discipline and was eventually linked to the fields of business and computer science. According to Gorgone et al. (2006), IS, as a discipline, incorporates the management concepts of information technology resources and the operation and evaluation of infrastructures and systems in organizational processes (referred in Reichgelt et al., 2004). In Saudi Arabia, IS undergraduate programmes are taught at two types of colleges: computerized IS (CIS) is taught in schools specializing in computer science, whereas management information systems (MIS) is taught in business schools. Many CIS programmes are accredited by the Accreditation Board for Engineering and Technology (ABET, 2015-2016), whereas MIS programmes tend to be accredited by the Association to Advance Collegiate Schools of Business (AACSB). Each programme type reflects “the legacy of when the plan was founded, where the course of study is housed, and/or local political academic turf disputes and compromises” (Reichgelt et al., 2004). Additionally, Topi et al. (2010) contend that as a field, IS contributes to many other disciplines and has different names, each implying different historical development in the discipline. Namely, the definition of IS appears to vary based on the interpretation of its object of study and its programme structure within the institution where it is based. For convenience, the courses offered at computer science colleges are referred to here under the heading of Computer Information Systems (CIS), and the courses offered at business schools are referred to as Management Information Systems (MIS).

The research reported in this paper results from a comparison of two groups of 20 undergraduate programmes on IS offered at Saudi Arabian colleges. Each group comprises ten programmes. Although all programmes focus on IS, they differ between the two groups in terms of the number of credit hours dedicated to IS environment and IS specialisation courses. IS environment courses focus teaching on the area of practical application of information technology. In other words, IS environment courses address the operation of IS by orienting teaching to the real world context where knowledge of IS will be applied. Both CIS and MIS programmes tend to hold international accreditations. CIS programmes are accredited by the ABET, whereas MIS programmes tend to be accredited by the AACSB. This paper strives to answer the following questions: What distinguishes the CIS and MIS programmes from each other? Specifically, which courses and aims set these two types of programmes apart?

II. RESEARCH METHODOLOGY

A list of 20 Saudi Arabian colleges’ undergraduate programmes in IS was drafted. IS is taught in both business and science colleges. The list was segmented into two lists of ten colleges, namely, business colleges and science colleges. The credit hour ratios of CIS programmes were determined based on the two lists. The courses taught at the colleges were divided into the following six categories:

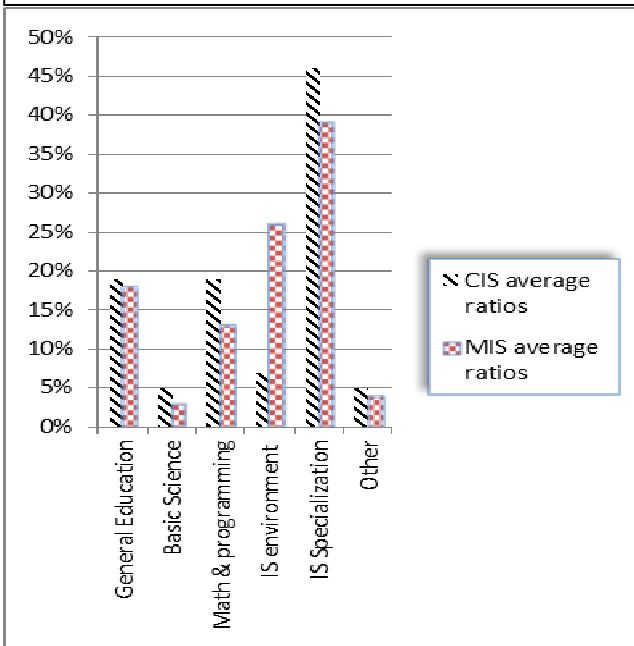
1. General Education,
2. Basic Science,
3. Math and Programming,
4. IS Environment,
5. IS Specialization, and
6. Other.

After identifying the categories, the number of credit hours representing each category was calculated. Then, each category value was established by dividing the total credit hours of the programme by the credit hours of the course, thus resulting in a ratio indicating the priority of each category in a given programme (see Figure 1).

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Figure 1: Comparison of the credit hour ratios of CIS and MIS programmes



Based on the ratio of each category, the average of all categories in each programme was determined. The resulting two averages facilitated a comparison between the CIS and MIS programmes.

III. DIFFERENTIATING IS SPECIALIZATION AND IS ENVIRONMENT

IS specialization courses focus exclusively on IS, whereas IS environment courses focus on the area where IS will be applied. Thus, IS can be defined as follows: “A combination of hardware, software, infrastructure and trained personnel organized to facilitate planning, control, coordination, and decision making in an organization” (Business Dictionary). In general, IS aims to help graduates develop “the ability to support the use, delivery, and management of IS within an IS environment” (ABET, 2004). Representative courses include Analysis and Design, Database Management Systems, Information Technology Infrastructure, and Information Security. The IS environment refers to a wide area, as this environment corresponds to the operation of IS and thus to the contexts wherein information technology is applied. Thus, the IS environment does not refer to an information system but in the context where IS is used. Thus, “it represents the ecosystem in which IS are employed” (Yaverbaum et al., 2004). Examples of information systems environments include business processes and functional business areas, banking, finance, communication, retail business, health care, and e-business. According to Yaverbaum et al. 2004, the notion of an IS environment originates from systems theory, a theory widely accepted across numerous disciplines. Systems theory defines open systems as systems that interact with their environments and are impacted by the environments in which they exist. Sauter (2000) explains that the IS environment represents “everything that is important to understand the functioning of the system, but is not part of it” (quoted in Yaverbaum et al., 2004, p 5.). Hence, “the environment is not part of the system, but influences it and is influenced by it” (Yaverbaum et al., 2004, p. 4).

IV. FINDINGS

This article is the result of a comparison of 20 undergraduate programmes in IS offered at Saudi Arabian colleges. All programmes focus on IS. However, two key differences exist among the programmes that can be summarized under the two headings of CIS and MIS. CIS programmes are taught at science colleges, whereas MIS programmes are taught at business colleges. Many CIS programmes are accredited by the ABET, whereas MIS programmes tend to be accredited by the AACSB. A list of 20 Saudi Arabian colleges’ undergraduate programmes in IS was drafted. The list was divided into two groups of programmes, one group corresponding to programmes offered at computer science colleges and another group and the other group corresponding to programmes offered at business colleges (see Appendix A). After drafting the list of categories, the number of credit hours of courses in each category was calculated. Then, each category value was determined by dividing the total credit hours of the course by the total credit hours of the programme. The resulting quotient was a ratio indicating the priority of each course category within a given programme (see Appendix A). Based on each ratio, the averages of each category for a given programme were calculated. The resulting average facilitated comparisons of the IS and MIS programmes (see Table 1). Some universities offer both CIS and MIS programmes, although in general, CIS programmes and MIS programmes are taught in science colleges and business colleges, respectively. Some CIS programmes are accredited by the ABET, whereas MIS programmes tend to be accredited by the AACSB (see Appendix A). CIS programmes tend to focus more on technology compared with MIS programmes, whereas MIS programmes tend to highlight IS environment fields, such that MIS course content emphasizes the organizational and behavioural aspects of the IS field.

Table 1: Average distribution of courses between CIS and MIS programmes

	General Education	Basic Science	Math and Programming	IS Environment	IS Specialization	Other
CIS average ratios	19%	5%	19%	7%	46%	5%
MIS average ratios	18%	3%	13%	26%	39%	4%
Difference	1%	2%	6%	19%	6%	1%

Each programme type reflects “the legacy of when the plan was founded, where the course of study is housed, and/or local political academic turf disputes and compromises” (Yaverbaum et al., 2004). Additionally, Topi et al. (2010) argue that as a field, IS contributes to many other disciplines and has different names signifying different historical developments in the field. It appears that IS is defined differently based on the interpretation of its object study and

the programme structure of the institution where it is based. IS specialization courses attempt to integrate “information technology solutions and business processes to meet the information needs of businesses and organizations...” (Yaverbaum et al., 2004). Hence, IS is treated as an application of information technology to assist organizations in determining how “information and technology-enabled business processes can provide a competitive advantage” (Yaverbaum et al., 2004)

V. MAIN COURSES OFFERED BY THE TWO TYPES OF PROGRAMMES

The two types of programmes differ in terms of the IS specialization courses and IS environment courses they offer. Nonetheless, despite differing course titles, common courses can be identified. IS specialization courses typically address the following subjects:

1. Foundations of IS
2. Analysis and design
3. Database management systems
4. Information technology infrastructure
5. Project management
6. E-commerce/E-business
7. Ethics and society
8. Operating systems
9. Information security
10. Web application development
11. Data warehouse and data mining
12. Human computer interaction
13. Enterprise architecture
14. Information systems strategy
15. Graduation project

Typical elective courses include the following:

1. Application development
2. Business process modelling and simulation
3. Data warehouse
4. Decision support systems
5. Expert systems
6. IS innovation and new technologies
7. Information technology audit and controls
8. Knowledge management
9. Special IS topics
10. Cloud business application

Typical IS Environment courses include the following:

1. Economy
2. Business
3. Management
4. Marketing
5. Finance
6. Accounting
7. Organisation

Basic Science courses vary widely between both programmes. By contrast, the General Education course does not vary between both programmes. Some programmes offer few General Education credit hours, and some programmes do not offer any courses in this area. Thus, the dissimilarity or similarity of the two programme types can be established by comparing course offerings in the remaining three subject

areas: Math and Programming, IS Environment, and IS Specialization. Mathematics and programming are important prerequisites for learning many programming languages. Some prerequisite courses include the following:

1. Calculus (1, 2)
2. Algorithms & Data Structure
3. Discrete Structures
4. Probability & Statistics
5. Modern Programming Languages

The main differences in the course offerings correspond to the IS environment courses and the IS specialization courses (see Figure 1). Comparing the credit hour ratios of the CIS and MIS programmes revealed that CIS programmes offer 6% more IS specialization course credits (46%) than do MIS programmes (39%) and that MIS programmes offer 19% more IS Environment course credits (26%) than do CIS programmes (see Table 1). However, such trends were not found in all college programmes. Additionally, no significant difference exists between the ratios of other course offerings (see Figure 1).

VI. THE DIFFICULTIES ENCOUNTERED DURING DATA COLLECTION

Be sure that the A major obstacle encountered during data collection was finding university plans, primarily due to the poor accessibility of programme information. All colleges were contacted to obtain the necessary data. Few colleges answered our information request. However, some polite individuals replied with a link to the requested data, thus allowing us to download some of the required data.

VII. CONCLUSION

This paper reported a comparison of 20 taught undergraduate programmes in IS at Saudi Arabian colleges. The two main programme types were CIS and MIS. The differences between the two programmes were mainly related to where they are taught (either business or science colleges) and the type of courses offered. Additionally, a greater proportion of programmes were CIS programmes, and CIS course offerings are likely to increase in the coming years. The paper attempted to identify the courses and aims that distinguish the two programmes from each other. The distinct features of the two programmes relate to differences in course content, particularly IS environment and IS specialization courses. MIS programmes tend to offer a greater number of IS environment courses compared with CIS programmes, thus possibly limiting graduates' understanding of IS technology. In contrast, CIS programmes offer fewer IS environment course credits than do MIS programmes, thus possibly limiting students' understanding of IS environments. This finding may contradict the perception of IS as responsive to business needs. Similarly, the greater number of IS technology credit hours offered by CIS programmes could be used to defend these programmes as being responsive to business needs, although courses on IS environments could be considered similarly responsive.

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Appendix A: Subject area credit hour ratios of 20 information systems programmes taught to undergraduates at Saudi Arabian colleges

Num	CIS: The credit hour ratios of Computerized Information Systems programs of 10 university colleges in Saudi Arabia College	University	Ratio						Total Credit Hours
			General Education	Basic Science	Math & Programming	IS environment	IS Specialization	Others	
1	College of Computer Science & Engineering	Taibah University	26%	8%	20%	6%	39%	1%	155
2	College of Computer & Information Sciences	King Saud University	26%	4%	30%	14%	23%	3%	103
3	College of Computer Science & Information Technology	University of Dammam	19%	10%	14%	6%	51%	2%	121
4	Computer & Information Technology	King Faisal University	10%	7%	17%	7%	55%	5%	121
5	Faculty of Computing & Information Technology	King Abdul Aziz University	17%	5%	17%	6%	46%	9%	124
6	College of Computer & Information Sciences	Imam Muhammad bin Saud Islamic University	18%	2%	26%	6%	47%	1%	128
7	College of Computer & Information Sciences	Prince Sultan University	16%	2%	16%	11%	43%	12%	134
8	College of Engineering	Effat University	19%	5%	12%	12%	42%	11%	128
9	College of Computer Science & Information Science	Princess Noura bint Abdul Rahman University	18%	0%	17%	8%	54%	3%	133
10	College of Computer Science	King Khalid University	18%	3%	21%	0%	58%	1%	151
Average			19%	5%	19%	7%	46%	5%	

Num	MIS: The credit hour ratios of Mangement Information Systems programs of 10 university colleges in Saudi Arabia College	University	Ratio						Credit hours
			General Education	Basic Science	Math & Programming	IS environment	IS Specialization	Others	
1	College of Business Administration	King Saud University	21%	0%	6%	19%	44%	10%	136
2	College of Business Administration	University of Dammam	4%	10%	17%	6%	60%	3%	121
3	College of Business Administration	King Faisal University	12%	0%	14%	36%	31%	8%	137
4	College of Business Administration	Salman bin Abdulaziz University	21%	4%	15%	21%	39%	0%	137
5	Faculty of Business (Rabigh)	King Abdul Aziz University	27%	0%	5%	31%	35%	2%	127
6	College of Computer Science & Information Systems	University College of Jubail	16%	0%	9%	38%	37%	0%	127
7	College of Business Administration	Prince Mohammad University	18%	6%	10%	33%	22%	12%	125
8	College of Business Administration	King Fahad University for Petroleum & Minerals	32%	2%	16%	30%	41%	3%	128
9	College of Business Administration & Economics	Qassim University	9%	0%	14%	44%	31%	2%	126
10	College of Business Administration	University of Hail	18%	3%	21%	5%	53%	0%	124
Average			18%	3%	13%	26%	39%	4%	