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Communications of the Association for Information Systems

INFORMATION SYSTEMS AND HEALTHCARE XVIII: THE INTRODUCTION OF A HEALTHCARE COMPUTER INFORMATION SYSTEMS UNDERGRADUATE PROGRAM

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ABSTRACT

As information technology has evolved and branched into Electronic Medical Records (EMR), the adoption of EMRs in healthcare has yet to permeate even half of hospitals. One factor in this lack of adoption is an insufficient supply of knowledgeable information technology professionals in the healthcare environment. To help resolve this shortage of professionals, an undergraduate degree to address technology, operations, and healthcare is proposed. This program builds on existing coursework in a state university to provide undergraduate students with the necessary knowledge, skills, and abilities to assist in the adoption, implementation, and ongoing maintenance of EMRs in the healthcare environment.

Keywords: IS governance, IS operations management, IS 2002 model curriculum, ITIL, IS education

I. INTRODUCTION

Research in the implementation of Electronic Medical Record (EMR) systems in the rural environment indicates that there is a shortage of qualified information technology (IT) professionals to enable such systems. [Wiggins, Beachboard, Trimmer, and Pumphrey 2006] To bridge this gap, the knowledge, skills, and abilities (KSAs) necessary to equip an IT professional in the EMR environment must be identified.

Fueling this need are federal requirements. A recent survey of hospitals reports only 24 percent of hospitals have a fully implemented EMR [Susman 2006]. Table 1 summarizes this survey. Health and Human Services has issued a call for movement to EMRs [Cato Institute 2006], and President Bush has expressed a desire for all citizens to have a personal electronic medical record by 2014 [HIMSS 2006]. In addition, agencies such as Florida Health Information Network

(FHIN) are mandating a minimal dataset that must be part of medical records submitted by providers [FHIN 2006].

Table 1. Implementation of Hospital EMRs [Susman 2006]

EMR Status	Percentage
Fully Implemented	24
Installation Begun	36
Contracts Signed	4
Planning	24
No Plans	12
Totals	100

A call from our new president at Idaho State University prompted us to perform a strengths, weaknesses, opportunities, and threats (SWOT) analysis of the relationship between the Health Care Administration and Computer Information Systems departments in the Kasiska College of Health Professions and College of Business respectively. In addition, a request through the ISWORLD listserv asking for information regarding healthcare programs in IS rekindled discussions we had previously considered during our prior health IT research. Knowing that a shortage of IT personnel existed in the local healthcare environment [Wiggins, et. al. 2006], we began an investigation of the KSAs needed by IT professionals in our locale.

To begin our investigation, we interviewed seven management professionals in five different health organizations. Two of the individuals (from separate organizations) were responsible for the day-to-day maintenance and support of their EMR and computer systems. The other participants ranged from management at three regional healthcare providers (family residency, hospital, rural clinics) to a software developer/consultant, and financial manager of a consortium of physicians. Participants' terminal education levels ranged from high school, undergraduate, and masters, to doctor of medicine.

We asked a series of questions regarding the baccalaureate qualifications an individual would need to be adequately prepared for a health IT position. Appendix A describes the questionnaire we administered.

The need for students to demonstrate competence in five broad dimensions was identified throughout all interviews. The dimensions are summarized in Appendix B. First, students must possess sufficient IT-oriented KSAs to operate the computer information system. The associate director of a family medicine residency commented that he “could teach a person medical terms, but not how to manage a network and extract data.” Second, a broad base in business administration, statistics, accounting, and the remaining “core” topics of an undergraduate business program and, third, a basic understanding of the healthcare environment, were deemed imperative. This was emphasized by the CEO of a regional hospital who commented that due to a wide range of IT systems, the desirable graduate would need to “make hospital bills understandable.”

The fourth area is for students to have hands-on exposure and experience with project management. EMR maintenance requires ongoing projects to implement existing and future software enhancements and to respond to organizational requests. The IT manager of a family medicine practice pointed out the “ability to manage vendor negotiations, contracting, and end user licensing” as desirable components of project management skill sets. A local consultant identified “familiarity with the Systems Development Life Cycle and IT projects” as a necessary KSA. The final dimension was experience – it was considered necessary for the student to have

hands-on exposure to IT within the healthcare environment. The executive director of an organization operating five rural clinics commented that “experience with networks and maintaining services” were desirable skill sets. In addition, the information systems specialist for this same organization outlined the necessity of an IT manager in healthcare to “function as the help desk contact, and top train and develop staff”. Furthermore, the CEO of a regional hospital commented that knowledge of health professions “make implementations easier” and the ability to communicate with a broad range of professionals in healthcare were also desirable characteristics of a new IT hire.

Having identified the need, and therefore an opportunity to offer a degree, we began to assess the strengths, weaknesses, opportunities, and threats of the university to offer the program. The opportunities for IT jobs in healthcare with the KSA dimensions described in our interviews with healthcare professionals are the primary motivation for this initiative by the university. The strength dimensions are highly consistent with existing departments and programs of the university. Thus, the primary strength of the proposed curriculum is to leverage existing courses within the university to provide a specialized curriculum focusing on healthcare information systems management.

The university offers a computer information systems (CIS) major and minor through the AACSB accredited College of Business (COB). Furthermore, membership of the COB and CIS department as one of the charter institutions in the National Excellence in Information Assurance program provides exposure to the emerging field of Information Assurance, which is vital in EMR environments. The IT manager for the family residency pointed out basic knowledge of information security practices and the ability to respond to technical incidents as desirable knowledge and skill sets. The first two requirements identified in opportunities analysis could be satisfied through existing courses: the first through the CIS programs and the second through the business core curriculum.

The university has the healthcare delivery mission for the state through the Kasiska College of Health Professions. This college offers programs that are fully certified by AUPHA, the highest level of academic recognition available for healthcare programs. A Bachelor of Science degree in Health Care Administration is offered by the Department of Healthcare Administration, providing the capability for ensuring satisfaction for the third condition identified in opportunities analysis.

To satisfy the fourth condition, the COB offers an emphasis in operations management which includes project management, managerial accounting, operations and quality, and an overlap with the CIS major. In addition, students in CIS systems analysis and database courses have a semester-long project that they must manage using project management tools. Satisfying the first four requirements with strengths, this left only the fifth condition, experience, as an unmet match between analysis of strengths and opportunities.

To address the experience weakness, the family practice residency program was engaged. Because it is a department in the KCHP and uses a fully implemented EMR, it provides an opportunity for students to apply the knowledge gained via coursework and to garner hands-on experience in a healthcare environment. In addition, management of the FPR clinic is fully supportive of providing learning experiences for students, as their ongoing experience with EMR continues to generate new project requests. Appendix B provides a brief summary of the KSA dimensions and how they were resolved, notably the creation of the practicum in EMR.

Two dimensions were identified as weaknesses in the university's ability to offer the program. The first was the additional coordination necessary to support students enrolled in the program. Because of sufficient resources within the College of Business and a strong working relationship with the Kasiska College of Health Professions, this perceived weakness was mitigated. The second weakness was the lack of an existing practicum to provide students with the necessary experience to function as a healthcare information systems manager. This weakness was mitigated via the collaboration between the family residency program and the College of Business.

Having assessed the opportunities, strengths and weaknesses for the proposed program, we investigated potential threats to the proposal. Investigation into healthcare information management at the undergraduate level discovered that programs typically are strong on physiology and record-keeping, but short on the use and application of IT. Some institutions, including a regional university, offer accredited health-related degrees that contained database coursework. However, it is apparent that there is little competition at the undergraduate level for a CIS-oriented approach for healthcare management backed by an undergraduate business education.

II. PROPOSED HISM DEGREE

The proposed program, a degree in Healthcare Information Systems Management (HISM) builds on the existing Bachelor of Arts (BA) in Business Administration, minor in Computer Information Systems, and Operations Emphasis by adding Health Care Administration to the curriculum. To complete the minimum coursework of 128 hours (the university requirement for a Bachelor's degree), students must complete 45 hours of general education coursework. The student must also complete six hours in accounting, six hours in statistics, three hours of business law, and one hour of general business administration in order to be admitted to the College of Business.

Upon admittance to the COB, students begin their core courses for the B.A. in Business Administration. Upper division requirements consist of 25 courses, as detailed in Appendix B. Six of the COB credit hours will be satisfied by course work in Organizational Behavior and Marketing offered by the Department of Healthcare Administration.

To obtain the CIS minor, students must complete six credit hours of introductory programming and operating systems/hardware basics at the sophomore level. Then students take an additional 12 hours in CIS, three hours each of Systems Analysis and Design, Database, Networking, and Information Assurance.

The Systems Analysis and Design course doubles as an elective for the Operations Emphasis (OPS). The 12-hour OPS concentration consists of advanced operations management, project management, managerial accounting, and an elective. Upon completion of the CIS, OPS, and the general business degree, students are well grounded in problem solving, operations, and a broad level of computer support.

The final component of the HISM degree is 15 hours in Health Care Administration beyond the six that are taken to satisfy the COB core. Students are introduced to the United States healthcare system in a three credit entry-level course. Their knowledge of healthcare functions is enhanced with three senior-level courses. Enhancing their OPS emphasis, the HISM majors take one course in Healthcare Operations. A focused course in Healthcare Human Resources provides students with a perspective on human capital issues in healthcare, while a third course in healthcare information systems provides an enhancement to their CIS minor with discussions of HIPAA, HL-7, clinical systems, and other relevant healthcare system topics. The final component of the HISM degree is a practicum and research project for the student.

The initial plan for the practicum is to have students complete a three credit course under supervision of a sponsoring healthcare institution. Through the Kasiska College of Health Professions, a relationship exists with its Family Medicine Residency Program (FMED) program. An Electronic Medical Record (EMR) System is in existence at this facility. Although the creation of the practicum puts a demand on FMED, this is mitigated by a set of factors. FMED will be receiving "free labor" in the form of students who will be charged a lab fee for participating in the program. Management at FMED perceives this as an opportunity to assess additional projects as well as provide training for the local healthcare systems infrastructure. In addition, financial resources at FMED have increased due to efficiencies in workflow and billings due to the EMR. This creates a "win-win" situation as the university gets students trained, and FMED gets extra hands to help them enhance their system.

The FMED program is fully accredited by The Accreditation Council for Graduate Medical Education, in which one of the criteria is either the implementation or planned implementation of an EMR. Students will engage in eight hours of hands-on practicum work per week under supervision of the information manager at FMED, who will be granted adjunct faculty status upon inception of the program. Furthermore, the internship-type experience under external supervision is core to undergraduate HCA programs. In addition to the eight hours of practicum at FMED, students will also be required to develop a research project for FPR that will be presented as an exit requirement for the degree.

It should be noted that our proposed degree falls within the "fifty-percent" guideline of the Association for the Advancement of Collegiate Schools of Business (AACSB). The 45 hours of general coursework do not include the six hours of statistics, which do not count as COB coursework. The minimum of 15 hours of course work in the Kasiska College of Health Professions brings the total non-COB hours to 66, leaving the 62 hours of COB coursework at less than half of the total 128 hours for the degree, and meeting the requirements of the university. Components of the degree are presented in Appendix C.

Presently, the Notice of Intent (NOI) for the degree has been approved by the university Curriculum Council and Faculty Senate. It is scheduled to be reviewed by the university Academic Committee, consisting primarily of College Deans. Following anticipated approval by the Academic Committee, the NOI will be reviewed by peer institutions within the state and then considered by the State Board of Education (SBOE). Because the degree requires no additional financial outlays by the university, is a new program within the state, and is designed to aid students in contributing to the local and national healthcare environment, it is anticipated that the degree will be approved without deliberation by the SBOE.

III. CONCLUSION

In summation, we have developed a CIS focused degree for a growing sector of the US economy that seems to be in dire need of IT professionals, healthcare. We utilized a SWOT analysis and interviews with regional healthcare managers to determine the fit between the strengths of the university and the needs of healthcare providers and organizations. Utilizing existing majors, minors, and emphases, with addition of some applied/hands-on coursework, a degree has been proposed that utilizes existing university resources as the foundation for the new degree program. The only new requirement is the addition of the healthcare IT practicum with the family practice residency the initial partner.

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APPENDIX A

QUESTIONNAIRE

Goal: Identify knowledge, skills, and abilities (KSAs) for the healthcare administration information systems manager.

Interviewee:

Name

Institution

Title

Job Description

Education

Experience

Healthcare Experience

Questions:

Please discuss the KSAs for the ideal undergraduate hire.

Please discuss the minimum KSAs for an undergraduate hire.

Do the KSAs change for a graduate student hire? If yes, how?

Does the size of the organization impact the KSAs? If yes, how?

APPENDIX B

KSA Dimension	**Coursework Satisfaction**
Information Systems	Existing Major/Minor in Computer Information Systems in College of Business
Business Administration (Statistics, Accounting, etc.)	College of Business Accredited by Association for Advancement of Collegiate Schools of Business
Healthcare	Association of University Programs in Health Administration
Project Management	Operations Emphasis in College of Business
Experience	Practicum with EMR at Family Practice Residency, fully accredited by The Accreditation Council for Graduate Medical Education

University Programs Providing the Knowledge, Skills, and Abilities for Healthcare Information Systems Management Degree

Requirements	Lower Division	Non-COB	COB	Total
University General	45	45		45
College of Business Prerequisites				
Accounting			6	
Statistics		6		
Business Law			3	
Business Administration			1	
Subtotal	15			16
College of Business Core				
Business Administration			3	
Computer Information Systems			4	
Finance			6	
Management*			9	
Marketing*			3	
Subtotal				25
Computer Information Systems				
Introduction to Programming, OS, Hardware	6		6	
Systems Analysis and Design**			3	
Database			3	
Networking			3	
Information Assurance			3	
Subtotal				18
Operations Emphasis				
Operations and Productivity			3	
Project Management			3	
Managerial Accounting			3	
Subtotal				9
Healthcare Administration				
US Healthcare System	3	3		
Healthcare Human Resources		3		
Healthcare Operations		3		
Healthcare Information Systems		3		
Healthcare IS Practicum		3		
Subtotal		15		15
Totals	**69**	**66**	**62**	**128**

Anatomy of an Undergraduate Degree in Healthcare Information Systems Management

ABOUT THE AUTHORS

Dr. Ken Trimmer earned his PhD. in Management Information Systems from the University of South Florida. His dissertation focused on diversity of cross-functional teams in information systems development projects. Dr. Trimmer's teaching and research emphases are information systems pedagogy, systems development, healthcare information systems, information assurance, enterprise systems, and management information systems.

Dr. Carla Wiggins earned her doctorate in Health Services Research, Policy, and Administration from the University of Minnesota. Her dissertation described the differences in careers between female and male healthcare managers. She is an Academic Fellow of the American College of Healthcare Executives (ACHE), and an active member of the Association of University Programs in Health Administration (AUPHA) where she serves on the board of directors and as an

undergraduate program reviewer. In addition, Dr. Wiggins serves as the vice chair of the governing board and as a foundation board member of Portneuf Medical Center in Pocatello, Idaho.

A frequent speaker to healthcare and business professionals and to the academic community nationwide, Dr. Wiggins' teaching, research, and speaking emphases are in pedagogy, healthcare management, health insurance, healthcare governance, and health information systems.

Dr. John Beachboard earned his PhD. in Information Transfer from Syracuse University. His dissertation focused evaluating the effectiveness of federal IT management policies and practices. Dr. Beachboard's teaching and research emphasize IT strategy, IT governance, and IT operations management and information assurance.

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