MIS Faculty Perceptions Regarding The Reengineered Organizational & End-User Information Systems Curriculum In Information Technology Education

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ABSTRACT

The Office Systems Research Association's recent revision of the Organizational End-User Information Systems (OEIS) curriculum model provides an opportune setting for determining the value of the model regarding undergraduate education in end-user information systems. This study follows an established method for examining IS curriculum perceptions by MIS faculty in hopes of providing a realistic snapshot of the model's strengths and weaknesses to aid the actual decision and implementation process of end-user information systems undergraduate curricula. Key findings regarding the perceived importance of the curriculum objectives are reported as well as conclusions, implications and suggestions for future research in end-user information systems. Feedback from MIS faculty regarding possible methods for integrating enterprise systems concepts (ERP) are also reported. MIS academicians have shown that the model curriculum and the associated content objectives do indeed have value and is of considerable importance. In addition to its importance, the faculty validated and solidified that the curriculum does have merit in preparing OEIS undergraduate students for participation, as end user support personnel, in a digital, knowledge-based economy of unbridled change.

Keywords: End-user Information Systems, End-user Computing, IS Curriculum Development, Business Information Systems, Organizational & End-user Information Systems (OEIS), Enterprise Systems, Enterprise Resource Planning, OSRA (Organizational Systems Research Association)

INTRODUCTION

As new information technologies emerged and corporations engage in business process transformation, information technology (IT) managers and recruiters seek employees that have the background to match the current needs of the changing organization's infrastructure. MIS educators' credibility in the private sector and corporations is often solidified by the caliber of student that the employer's recruit and hire in today's global, knowledge-based companies. These future information systems employees often gain their training in university MIS programs, therefore, the university must continually evaluate whether their program parallels the needs of the students, while equipping them for a career in their chosen field.

Realizing that educational gaps often exist between what IT managers view as critical end-user skills and the curriculum that is currently being implemented in information systems undergraduate programs (Tang, Lee, & Koh, 2001), the Office Systems Research Association (OSRA) published an updated 2004 Model Curriculum in Organizational End-User Information Systems. The OEIS model is a guide for undergraduate curriculum design in the area of information technology (IT) developed by IT educators and business professionals through numerous web-based and face-to-face group sessions (Hunt, 2004). OSRA, now AIS-SIGOSRA, desires to provide a

knowledge base and curriculum framework that has currency and relevance. Scholarly debate continues to be ongoing in the development of curriculum models that surface by both the academic and practitioner communities. This manuscript provides an analysis of a stratified sampling of MIS faculty regarding perspectives on the components of the OEIS curriculum model—which was designed to prepared students with a foundation in information management and end-user information systems.

PROBLEM & PURPOSE

Because of the direct relationship between end-user information systems and MIS, the researchers sought to probe the perceptions of those in the Association of Information Systems (AIS) faculty membership and job placement who had either listed end-user computing and/or microcomputer applications as their teaching or research interest area. The research was an assessment and validation of the importance of the newly designed Organizational and End-user Information Systems (OEIS) Model Curriculum objectives based upon the perceptions of this AIS stratified sample. Even though the curriculum has been developed and approved by the sponsoring organization, an inadequate research base exists regarding the perceptions of the potential adopters. Moreover, to date there has been limited research conducted to judge its potential for implementation at the undergraduate level. Specifically, the purposes of the study were (a) to assess the level of importance of the OEIS Model Curriculum content and (b) to determine the current availability of OEIS course offerings at selected colleges and universities. The research study sought answers to the following questions:

1. Does congruence exist among AIS faculty who have a strong interest in end-user information systems, regarding the level of importance of the model curriculum?
2. What is the current status of OEIS course offerings at the colleges and universities wherein the MIS faculty currently teach?
3. What is the current potential for implementation of an OEIS undergraduate curriculum in IT education at the respondent's institution?

REVIEW OF IT EDUCATION LITERATURE

Many experts view the ability to remain globally competitive as absolutely essential if the U.S. is to maintain its current economic growth and standard of living, (Stine and Matthews, 2008). In response to the hyper-competitive global marketplace, there has recently been an upsurge in academia's questioning of how to structure curriculums to meet challenges which come from the increasing integration of national economies into a worldwide trading system (Ahearn, 2007; Ragan, 2007). There is also a stronger focus on the emerging, declining, contracted and in-house competencies needed by the technology workforce (Caputo, 2005).

One such effort was AACSB's (2002) new emphasis on the integrated interrelationships between functional areas of a business, so as to provide students with a stronger holistic understanding of how businesses operate. In this regard, Enterprise Resource Planning (ERP) systems, by their multidimensional, integrative, and normative nature, offer the strength of functionality and breadth of assimilation required for running global operations of business organizations (Tomei, 2008). In addition, because Business Process Integration (BPI) skills are now in such a high demand, many faculty are incorporating these competencies seamlessly into the OEIS core curriculum (Hunt, 2004), especially the Planning and Implementation course, and the Cases in Information Technology module.

Workforce Needs:

In terms of workforce needs, two current and diametrically opposed streams of thought exist. One school of deliberation asserts that U. S. technological employment demand has grown faster than U.S. IT related degree production, resulting in an approaching shortage of American IT workers. The second viewpoint perceives the issue of an impending U.S. IT labor shortage to be a myth. Let's briefly review both.

A Case for the Pending IT Labor Shortage:

The 2007 Bureau of Labor Statistics noted most new jobs will be for technicians at a growth rate of 19.8% in the years 2006-2016. Yet, one recent report estimated the country is facing a gap of 89,000 IT jobs in the next three to five years (Wahl, 2008). Given the premise there is a looming IT labor shortage, the situation can be attributed to the following major concerns: 1) A decreased number of American IT-related graduates; 2) Imminent retirement of Baby Boomers; and 3) Ever-changing IT skill set needs.

A Culture of Low IT Enrollments

After a 2002 peak, technology-related majors everywhere began a dramatic decline due to the following major market forces: (1) the 2001 dot-com bubble bursting; (2) the negative onslaught of media attention to outsourcing; (3) the increased enrollment of university women in tandem with a decline in male students; and (4) the decline in foreign student enrollment after 9-11 due to their inability to obtain visas (Smith & Hunt, 2008). By 2005, many came to believe the U.S. was not producing enough IT knowledge workers to maintain the competitiveness of the nation (Klawe, 2005). Recently, the 2007 National Association of Colleges and Employers (NACE) Report indicated there is a shortage and this impending deficit of skilled IT workers is resulting from a substantial attrition of both U.S. men and women pursuing technology-related degrees.

Since 2002 enrollment at universities for computer engineering, computer science and software engineering programs have declined by some 22 percent (Wahl, 2008). At some universities, the national trend of IS enrollment drops after 2002 were as high as 70% (Galleta, 2007). Alarmingly, the number of white males doctoral students in technology fields, who are typically drawn to the profession more than women or minorities has also significantly declined (Stine & Matthews, 2008). Furthermore, a long-running study of technological competitiveness by the Georgia Institute of Technology (2008) suggests China may soon rival the United States as the principal driver of the world's economy— a position the U.S. has held since the end of World War II. This report indicates that the 27 nations comprising the European Union, if taken as a single entity, would also surpass the United States in technological competitiveness.

Aging Technology Workers

Another aspect of the potential shortage of IT workers is the tsunami of 79 million Baby Boomers who will start to leave the workforce in 2010 (Plas, 2008). Many Boomers have the technical skills to keep the economy running, but they represent a larger cadre of people with more technical skills than the generations behind them (Kao, 2007). The U.S. Science and Technology Workforce Report to Congress (Stine & Matthews, 2008) also notes that many employers worry that an insufficient number of American technology-related students are in the pipeline to replace those who retire. The Homeland Security Department's top technology official, Jay Cohen, warned that the U.S. workforce is "in crisis" due to students fleeing math and science fields because they are viewed as too difficult and the payoff too distant. He notes that "Unless this generation is energized, the nation will lack a 'first-world economy' two decades from now," (Noyes, 2008).

Different Skill Set Needs

The 2007 Gartner, Inc. report implied the supply of people willing and able to understand and respond to technological business challenges will fall short of the rising demand for business change and growth. This skills shortfall will not be in terms of shortages of specific, technical skills and domain-specific expertise, but rather shortages of people with more general qualifications, experience and business insight that focus on understanding managing business processes and technology.

The role of changing technology skills can easily be seen in the evolution of mainframe systems versus distributed systems (Fabian, 2000). As a result of the newer distributed systems, the demand for most of the skills required to support mainframe systems diminished. Similarly, Anderson, Lee, & Kolding (2008) illustrate today's changing role of the network to a more business-enabling infrastructure. "The increased complexity of today's enterprise networks is increasing the demand for network consulting and integration skills," (p. 1). Their report

suggests the number of networking positions will grow 30% in the next four years. However, their report comments on the "IT skill gap" in this area. In other skill arena shortfalls, American employers increasingly cite: a shortage of applicants possessing "soft skills," (Eldredge, 2006, Xie & Bahaudin, 2008). For example, Mayurkumar Gadewar, an ERP consultant with Pricewater Coopers, noted it is essential to be technically sound, but one should also be able to convey the idea to the masses in the simplest possible manner (Lyer, 2005).

A Case Against an Impending IT Labor Shortage:

On the other hand, many do not agree there is an impending IT labor shortage. Yet, even among these proponents, there appear to be few who disagree with statistics which indicate that: 1) fewer students are graduating with IT related degrees since 2002; 2) that Baby Boomers are getting ready to retire in droves; and 3) newer IT skill sets are needed. Rather, the focus of those who believe the IT Labor Shortage issue is a myth, appear to focus more on the hiring difficulties of those who currently hold IT-related degrees and/or who might be interested in pursuing such a degree.

For example, Dr. Ron Hira, Professor of Public Policy at the Rochester Institute of Technology and co-author of the book "Outsourcing America" insists the U.S. has consistently graduated more than enough computer scientists and engineers to fill U.S. IT jobs (Chickowski, 2008). Studies done at Duke University, RAND Corporation, and Stanford University, among others, also do not show a current shortage of educated IT workers and suggest that such findings indicate there will be no future shortage. Lowell & Salzman (2007) at the Urban Institute also agree that current U.S. student performance rankings are comparable to other leading nations.

Proponents of the non-impending IT labor scarcity point-of-view question Bill Gates' Congressional assertion there is a shortage (Microsoft, 2008). They note that Microsoft gets hundreds of thousand s of job applications every year, but Gates still relocated major Microsoft research and development to China. According to a Duke University Study (Wadhwa, 2007), Gates' motive in saying there is a shortage of workers is to avert the real issue of cheap overseas labor. It is also worth noting that many people with technology skills are currently struggling to leverage the so-called hot U.S. labor market according to Silicon Valley headhunter Linda Tuerk (Kirby, 2008). Tuerk noted companies are often firing older, more-expensive workers -- people making 80 grand to hire two people right off the plane (H-1B workers) for 45 grand each.

IT Labor Shortage or Not – Implications For The Academia:

In terms of whether there is an impending IT labor shortage or not, it has been asserted by some that universities with a need to put students into those empty chairs created by the declining number of students in Computer Science, Information Systems and other IT related studies have perpetuated this IT labor shortage myth (Chickowski, 2008). In analyzing this claim, one must understand that while it is true that universities obviously are stakeholders in the desire to increase enrollment within these areas of concern, it doesn't negate the fact that it is the universities' responsibility to provide business and technology skill sets that enable our students to be marketable relative to demand. Nor does it negate the need for American universities to prepare our business and technology students for a globally competitive marketplace.

Regardless of mind set concerning a shortage or not, there appears to be a consensus the skill set needed by IT students in the 21st century requires a greater in-depth understanding of business and technology, as well as soft skills-all of which are major components of the OEIS Model and this research study. It is encouraging that AACSB (2002) is promoting curriculum integration as a means to provide high quality education. However, this technique departs significantly from traditional function-centric business education. As such, most business schools today still teach primarily the traditional, long established functional courses that focus primarily on products and offer little or no integration (Davis & Berdrow, 2008).

Nonetheless, if we are to meet the needs of our business and technology students in preparing them to be marketable relative to demand, we as educators must improve our curriculum to meet those needs. One such method is in the use of Enterprise Resource Planning (ERP) applications. "An increasing number of universities have attempted or are planning to incorporate popular enterprise system software products such as SAP R/3 into the

business school curricula," (Tomei, 2008, p 436). Furthermore, several faculty on the OEIS Curriculum Task Force have also taken the quantum lead of integrating business process integration—in specific course modules, that are either in the core or are recommended, optional electives.

RESEARCH DESIGN & METHODOLOGY

The following procedures were used to conduct the study:

- Reviewed related research and curriculum literature in this area of concentration.
- Selected the faculty population and developed a stratified sample of the MIS faculty population based upon teaching and research interests in this specialization.
- Identified and classified the components which comprise the content of the courses in the OEIS model curriculum (See Appendix A).
- Established content validity by submitting the components to a panel of experts composed of IT educators and practitioners—all members of the OEIS curriculum group.
- Formulated a web-based questionnaire (using Facilitate.com) survey tools to electronically collect MIS faculty perceptions regarding the OEIS Model Curriculum.

Table 1: ***Demographic Institutional and Faculty Profile***

Questions	Items	Count	Percent
Location within Institution:	College of Business	34	82.9%
	College of IT	2	4.9%
	College of Science	2	4.9%
	Other	3	7.3%
Location of Responding Institution by geographic association:	Northwestern US	2	4.9%
	Southwestern US	11	26.8%
	Northeastern US	9	22.0%
	Southeastern US	16	39.0%
	Outside US	3	7.3%
Classification of Institution:	Public College/University	36	87.8%
	Private College/University	4	9.8%
	Other	1	2.4%
Number of Full-Time Faculty in the Department:	3 or Fewer	1	2.4%
	4-6	4	9.8%
	7-9	7	17.1%
	10 or more	29	70.7%
Total Number Years of Teaching Experience:	1-5	11	26.8%
	6-10	7	17.1%
	11-15	6	14.6%
	16 or more	17	41.5%
Total Institution Enrollment:	Less than 5,000	5	12.2%
	5,000-9,999	8	19.5%
	10,000-14,999	7	17.1%
	15,000-19,999	8	19.5%
	20,000 or more	13	31.7%
Accreditation status of your IT program:	ABET	0	0%
	AACSB	27	65.9%
	ABET & AACSB	2	4.9%
	Other Accreditation	7	17.1%
	Not Accredited	5	12.2%
Current existence or potential for implementation of OEIS/IT undergraduate program at respondent's institution	Planning Stages	2	4.9%
	Currently Implementing	5	12.2%
	Already Implemented	19	46.3%
	No intention to Implement	15	36.6%

The finite population for the study consisted of 274 AIS faculty email addresses of academicians who had noted end-user computing as a teaching and/or area of research interest in the AIS Job Placement for 2004 or had listed this area of interest in the AIS membership profile. Of the 274 emails that were sent, 83 were returned as undeliverable, making for a total of 191 submissions. Of the 191 submissions, 42 (or 22%) usable survey responses were received. The data gathered included demographic profile data, assessment of the OEIS curriculum objectives, and current status of OEIS course offerings.

The demographic institutional and faulty profile is shown in Table 1. Responses from MIS educators revealed that 87.8% of the faculty is from public universities. A majority (82.9%) of the institutions and faculty are affiliated or closely allied with a school/college of business. In 70.7% of the institutions, the OEIS component is staffed by 10 or more faculty members. Approximately 41.5% of the respondents have 16 or more years of teaching experience. The largest concentration of institutions (31.7%) has student enrollments of more than 20,000 students. The majority of the faculty (63.4%) indicated than an OEIS curriculum either currently exists or the institution is in the process of implementing this type of concentration within their respective college/university.

In addition to a demographic profile of the MIS faculty, the web-based research instrument was designed to ascertain MIS educator perceptions regarding the specific objectives of the curriculum. Respondents were asked to evaluate the level of importance of the 50 components that had been developed by the researchers and validated by the panel of experts. Each component was evaluated on the following five-point scale: 5= of extreme importance, 4-of considerable importance, 3=of some importance, 2=of little importance, and 1=of no importance.

The researchers established a mean response of 3.5 as an indicator of agreement among IT educators as to the level of importance of the OEIS curriculum. An additional section of the web-based questionnaire queried faculty responses regarding the availability of OEIS courses in their respective institutions.

The objectives for the twelve of the thirteen courses in the OEIS curriculum model provide the bases for the instrument developed to seek the opinions of information systems faculty perceptions regarding the curriculum. Only twelve courses are examined due to the all-encompassing nature of the special topics course.

DATA ANALYSES & RESULTS

The survey results indicated that the average information systems program already offers 6.6 of the 12 OEIS curriculum courses. The average program plans on adding on average 2.2 more. Of the courses not currently implemented, the ones for which implementation is most often planned are:

- OEIS-12 Information Systems Security,
- OEIS-06 Cases in Information Technology, and
- OEIS-09 Collaborative Technologies and Knowledge Management

On average, there are no plans to offer 5.1 of the OEIS curriculum courses. The least frequently implemented courses are shown below.

- OEIS-04 Technical Training and Delivery Methods, and
- OEIS-02 Computer User Support

The course topics were generally rated high, with a high of 4.21 for OEIS-01 Organizational and End-user Information Systems related content, a low of 3.53 for OEIS-10 Network Administration course related content , and an overall average on all objectives of **3.91** (as shown in Appendix B) which was indicative of considerable importance. The high average shows that the OEIS curriculum blankets the important areas of study rather well and that it closely and authoritatively represents what should be covered. Also noteworthy is the fact that information systems security, collaborative technologies, and knowledge management were perceived as highly important in content coverage given the paradigm changes in our digital economy. MIS faculty indicated that the technical training, even though important, was of lesser importance than some of the objectives that related directly to end-user support.

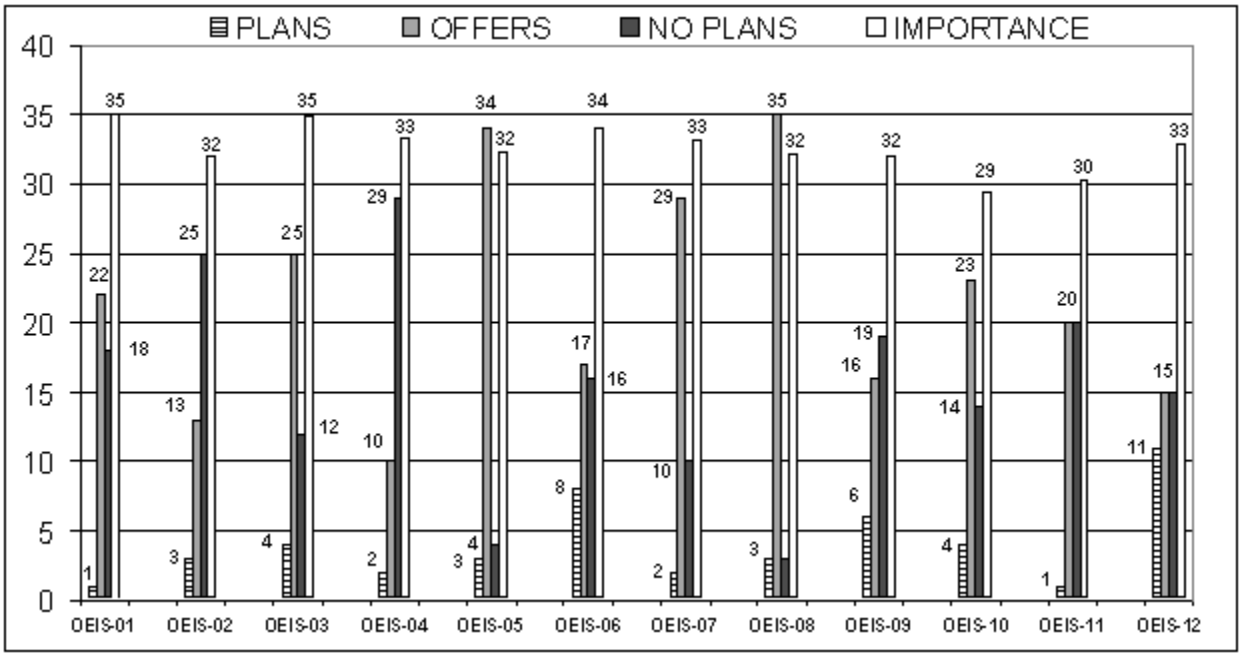
Table 2. Course Offering Gaps

Course	Description	Plans	Offers	Offers + Plans	Avg. Rated Importance	Scales Avg. Importance	Offering Gap
(a)	**(b)**	**(c)**	**(d)**	**(e) = (c)+(d)**	**(f)**	**(g)**	**(h) = (g)- (e)**
OEIS-04	Technical Training and Delivery Methods	2	10	12	4.0	33	**21**
OEIS-02	Computer User Support	3	13	16	3.8	32	**16**
OEIS-01	Organizational and End-user Information Systems	1	22	23	4.2	35	**12**
OEIS-09	Collaborative Technologies and Knowledge Management	6	16	22	3.8	32	**10**
OEIS-06	Cases in Information Technology	8	17	25	4.1	34	**9**
OEIS-11	Operating Systems	1	20	21	3.6	30	**9**
OEIS-03	Assessment, Design, Implementation, and Evaluation	4	25	29	4.2	35	**6**
OEIS-12	Information Systems Security	11	15	26	3.9	33	**7**
OEIS-10	Network Administration	4	23	27	3.5	29	**2**
OEIS-07	Internship	2	29	31	4.0	33	**2**
OEIS-05	Telecommunications and Networking Foundations	3	34	37	3.9	32	**-5**
OEIS-08	eBusiness and Web Technologies	3	35	38	3.9	32	**-6**
Correlation		**0.089**	**-.040**				

Table 2 depicts the course offering gaps in the curriculum. The course offering gap is the difference between the scaled average course importance, and the frequency with which the course is offered or is planned to be offered. To avoid respondent bias, the respondents were asked to rate the importance of a specific objective on a 5-point Likert scale without referencing any specific course module. The researchers later obtained a scaled average rated importance by linking each specific objective with the course module wherein that objective is most often presented. There were no meaningful correlations between the actual importance of a course as measured by how frequently it is offered (-0.040), is planned to be offered (0.089), or is not offered (0.007), and how highly the topics that constitute that course were rated in term of their perceived importance.

As shown in Table 2, the courses that are most often ignored are OEIS-04, Technical Training and Delivery Methods, and OEIS-02 Computer User Support. It is interesting to see the low ratings for OEIS-04 and OEIS-02—given that these areas are very important for any type of information systems software or hardware implementation. Both have large course offering gap ratings, 21 and 16, respectively. Conversely, a negative number means the course is over-represented relative to the perceived importance rating of the topics it addresses. This is the case with OEIS-05 Telecommunications and Networking Foundations, and OEIS-08 eBusiness and Web Technologies, two older and widely implemented more technical courses. The finding that the more people-oriented courses OEIS-04 and OEIS-02 are being overlooked, when the more technical courses OEIS-05 and OEIS-08 are being strongly supported, is an important finding of the study. Figure 1 compares the course offering frequency with the scaled average-rating for course importance.

Figure 1. Course Offering Frequency Compared To Scaled Rated Importance



The small sample size has constrained the statistical analysis. Although the response rate was high (41 replies out of 191+ mailings, or about 22 %), we are still rather limited in our statistical analysis because of the small sample size (n = 41) relative to the complexity and interdependencies of the issues addressed.

Other analyses such as ANOVA or factor analysis were not conducted due to the small sample size. Means tests such as student t, and related confidence intervals as a measure of error, are also not appropriate because the assumption of normality is not met. As shown in Appendix A, the average mean score of the responses was 3.91 for topic significance, and the lowest average was 3.4, when in a normal sample distribution the average of the responses should have been 3.0 with a low and highs fairly close to 1 and 5. Some bias is expected due to the fact that the topics and courses listed are all important at some level to the MIS curriculum. The high average solidifies and supports the position that the OEIS curriculum blankets the important areas of study rather well and closely represents what should be covered.

CONCLUSIONS & RECOMMENDATIONS FOR FUTURE

MIS academicians have noted that the OEIS curriculum design and the associated content objectives of the reengineered OEIS Curriculum Model do indeed have value and is of considerable importance. In addition to its importance, the faculty validated and solidified that the curriculum does have merit in preparing OEIS undergraduate students for participation, as end user support personnel, in a digital, knowledge-based economy of unbridled change. The implications are especially important for colleges and universities that have adopted only portions of the model's content. Educators should keep in mind that the faculty respondents were evaluating objectives and outcomes, not courses. In cases where the implementations of entire courses are not possible, educators should consider incorporating content related to the highest-rated objectives into existing IS courses.

Educators whose programs do not include an internship should consider adding such an experiential learning arrangement. Educators whose programs already include an internship experience should assess the nature of internship experience to determine if such experiences are related to end-user information systems in some way.

To supplement and validate the findings of this study, further research by other stakeholders is essential. Investigation and assessment of the extent to which individual programs are meeting program objectives is also

needed. The success rate of end-user information systems graduates in the workforce will be determined by the extent to which program objectives are being met. As MIS educators, we must always remember that business students are not only our *customers*, they are our *products*.

Consequently, a continual stream of research on trends and issues in end-user information systems would provide a further knowledge base and framework for designing future undergraduate curricula. Moreover, to ensure that the curriculum content maintains relevance and currency, it is imperative that an ongoing review be conducted by the OSRA executive board or a designated committee comprised of both IT practitioners and academicians. Lastly, given the importance of these validated objectives, our doctoral granting universities must continue to implement graduate-level courses that will assist IT educators in the preparation of knowledge workers and end-user support personnel.

With this available research base, MIS educators have a validated framework and guide for implementation of a track or emphasis in end-user information systems at the undergraduate level. To enhance these programmatic efforts, institutions of higher learning must ensure that avenues are made available for professional development in this area. What educators do to facilitate the implementation process (at each institutional level) will be the practical application of this research process. Collaboration of all those involved with end-user information systems will help achieve this goal.

AUTHOR INFORMATION

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APPENDIX A

OEIS Model Curriculum

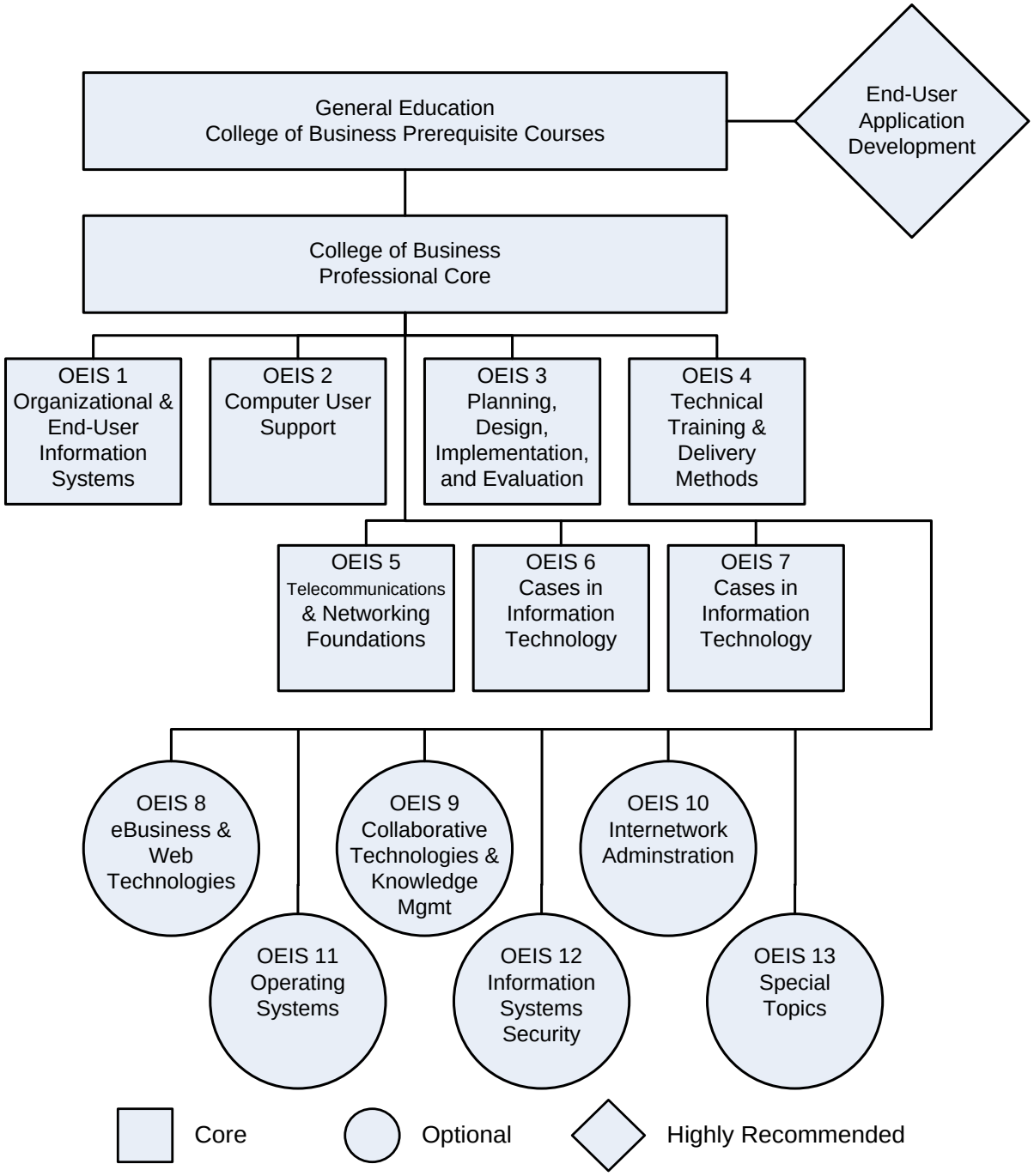

Figure 2. The 2004 Organizational & End-user Information Systems Model Curriculum; http://www.osra.org

APPENDIX B

Mean Scores of MIS Faculty Perceptions Regarding Level of the OEIS Specific Objectives
(5 = extreme importance, 4 = considerable importance, 3 = some importance, 2 = little importance, 1 = no importance)

OEIS Objectives in the Model Curriculum	Mean Score	Std Dev	N
Identify human factor issues associated with the use of OEIS technologies.	4.4	0.9	41
Identify project objectives and end-user requirements.	4.4	0.7	41
Articulate the relationships among various end-user information systems from both business and technical perspectives.	4.3	0.7	41
Describe characteristics of end-user work environments and the impact of information technology on work performance.	4.3	0.7	41
Assess user needs and recommend computer solutions.	4.3	0.7	41
Identify organizational and management issues related to the use of technology in the workplace.	4.3	0.8	41
Evaluate alternative solutions from both the end-user and technical perspectives.	4.3	0.7	41
Understand global and ethical issues as related to end user information systems.	4.3	0.8	41
Consider the need for, and analyze the impact of, information systems security in the daily functioning of organizations.	4.2	0.9	41
Explain how systems concepts can be applied to the planning and implementation of end-user support systems.	4.2	0.8	41
Apply project management methodology and tools to the development of a EUIS systems analysis and design project.	4.2	0.8	41
Describe the concept of end-user technology support and differentiate possible approaches for providing such support to end users.	4.1	0.8	41
Defend the selected solution in the context of real-world business problems.	4.1	0.8	41
Be able to undertake a basic review of the information security practices, techniques, and methods being used to secure an organization's information assets.	4.1	0.9	41
Justify the desirability of strategic planning and how EUIS solutions can drive organizational goals.	4.1	0.8	41
Reporting and documenting activities via oral presentation and supporting multimedia.	4.0	0.9	41
Install, configure, upgrade, and maintain software.	4.0	1.0	41
Design cost-effective technical training including new training and upgraded training.	4.0	1.0	41
Understand the context of Internet processes within the overall functioning of global organizations.	4.0	0.8	41
Discuss effective applications of emerging communication technologies.	4.0	0.8	40
Complete an internship to demonstrate readiness for entry-level employment in an IT-related position.	4.0	1.0	39
Understand and apply the concepts and theories underlying the administration of information systems security.	3.9	1.0	41
Recognize the value of virtual collaborative web-based groupware tools.	3.9	0.9	40
Examine and use current methodologies for the design, implementation, and monitoring of secure information systems.	3.9	0.9	41
Recognize and apply appropriate web design techniques to meet user requirements.	3.9	0.9	40
Identify problems and formulate solutions related to telecommunications and networking.	3.9	0.8	41
Develop sufficient technical expertise to create informative web pages.	3.8	0.9	41
Demonstrate an understanding of the vocabulary and theory of telecommunications and networking.	3.8	0.8	41
Investigate key functional aspects of web-based applications.	3.8	0.9	41
Demonstrate an understanding of software system maintenance, upgrading, and troubleshooting.	3.8	1.1	41
Apply qualitative and quantitative methods of analysis through case studies.	3.8	1.0	39

Identify and prescribe solutions for commonly occurring Helpdesk end-user problems.	3.7	0.9	41
Set up, install, configure and troubleshoot hardware.	3.7	1.1	41
Evaluate alternate Internet based business models and strategies for e-commerce, i.e., Virtual Store Fronts,Enterprise Content Providers.	3.7	0.9	41
Set up, perform, and verify disk, directory, and file backups.	3.7	1.2	41
Implement and use group support systems for managing knowledge in contemporary organizations.	3.7	0.9	41
Develop course delivery systems for training end-users.	3.6	0.9	41
Create workplace design solutions to ensure worker comfort, safety, and productivity.	3.6	1.0	41
Recommend learning and performance measures for the selected training type.	3.6	1.0	41
Define Knowledge Management in terms of its strategies, properties, resources, and outcomes.	3.6	0.9	41
Function as an entry-level facilitator and team leader in a collaborative technology setting.	3.6	1.0	41
Demonstrate the use and understanding of different operating system platforms--Windows, Unix, and Macintosh.	3.6	1.0	41
Demonstrate an understanding of operating system installation, patching, and upgrading.	3.6	1.1	41
Understand the prevalent models for developing technical training.	3.5	0.9	39
Acquire web page authoring skills using currently popular web editor tools.	3.5	0.9	41
Assign users to groups while ensuring adequate security permissions on the network.	3.5	0.9	41
Manage, configure, and troubleshoot networked software connections.	3.5	1.1	41
Develop a systematic implementation and evaluation plan for Knowledge Management in a realistic organizational environment.	3.4	1.0	41
Write and evaluate reports generated through multiple Helpdesk reporting solutions.	3.4	0.9	41
Implement, monitor, and troubleshoot basic digital security certificates and encryption keys.	3.4	1.0	41
Overall Average Level of Importance	**3.91**		