S.W.O.T. YOUR MIS CURRICULUM:
MIS CURRICULUM ASSESSMENT AT A SMALL
MIDWEST UNIVERSITY

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Abstract

The MIS field is in the midst of changes in both the job market and technological advances in hardware and software. To have success in the MIS field, new professionals entering the market must possess skills that are relevant to the current industry needs. It is the task of University faculty to recognize and incorporate these industry requirements into their curriculum. To establish these industry requirements it is necessary to periodically review the program curriculum. The purpose of this paper is to describe the actions and results of the Millikin University MIS department's curriculum review using the management approach of identifying Strengths, Weaknesses, Opportunities and Threats (SWOT).

Introduction

A survey was distributed to Millikin alumni who graduated with an MIS degree over the last 15 years. The extended time span captures input from alumni in positions other than entry level. The survey addresses course content, computer languages, and several general skills. The survey addresses current job assignments, anticipated skill requirements and important skills for an entry level MIS professional. The survey results are then compared to interviews with a number of key regional employers. Finally, these results are compared with the current curriculum offerings and those offerings by peer and aspiration institutions.

The impact of this SWOT analysis is to determine the course offerings and course content to provide our students with the skills required and a competitive advantage for employment. Secondary impacts of the study affect faculty selection and assignment.

What is S.W.O.T?

The SWOT analysis is an extremely useful tool for strategic planning, developed from the need to discover why corporate planning failed.   SWOT is a business model, which the acronym stands for Strengths, Weaknesses, Opportunities, and Threats.   The analysis came from the research conducted at Stanford Research Institute from 1960-1970. (Chapman, 2004)

SWOT analysis can be used for all sorts of decision-making, and the SWOT template identifies factors that may affect desired future outcomes of any organization or institution   The SWOT template is based on identifying the organizations or institutions internal **S**trengths and **W**eaknesses. The organization or institution looks externally for the **O**pportunities and **T**hreats. The SWOT model's object is to take advantage of internal situation and the external environment.

Topic of SWOT Analysis	
Strengths (Internal)	**Weaknesses (Internal)**
Opportunities (External)	**Threats (External)**

Figure 1: SWOT Analysis Template

In an educational model the internal strengths could be faculty, accredited curriculum institution location, name recognition of the institute, and capital. Examples of internal weaknesses might be lack of technology, classroom space or resistance to change. External opportunities examples could be increased student enrollment and improved name recognition whereas external threats could come from same size completive universities, insufficient enrollment or lack of demand for graduates. The SWOT analyses should lead to a competitive strategy that the institution will implement (Chan & Welebir, 2003).

Another industrial model that focuses on a competitive advantage is Michael Porter's *Five Force model*. The five forces model was intended to be used by industry as a tool to help decide if a particular industry should be entered or expand their established operations (Haag et al, 2004).

Porter's five forces

1. Existing competitive rivalry between suppliers
2. Threat of new market entrants
3. Bargaining power of buyers
4. Power of suppliers
5. Threat of substitute products (including technology change)

The SWOT analysis and the Porter five forces combined will give a relevant insight to the institution's competitive strategy.

Current industry requirements

According to Computerworld's January 18, 2005 article " IT compensation on the rise in '05" states the hiring decline in the Information Technology (IT) world will turn upwards in the year 2005 (Lee, 2005). "Those with highly sought-after skills are beginning to receive multiple employment offers as demand for their talents grows." The technology specialties in demand are networking, technical support, internet/intranet development, database management, application development, and project management. The most sought after position in 2005 according to the article will be system auditors, pre-and post sales consultants, and programmer/analysts.

Methodology

This study consists of a three phased approach towards our curriculum analysis. These phases include alumni survey, regional employer interviews and peer & aspiration school program review.

The skill areas evaluated using an on-line survey include computer languages, database management, system management functions, e-business and individual business capabilities. The first two questions used a 7 point Likert scale to rate the frequency of use or importance of the skill, with 7 representing Daily usage, 5 representing Most Times usage, 3 representing Sometimes usage and 1 representing Not At All. Question 3 asked the respondents to rank the skills relative with 1 being the most important and 16 being the least. The skills explored were:

- COBOL
- JAVA
- C++
- Visual Basic
- Object – Oriented Programming
- Web Programming
- Database design
- Database Management
- Networking of systems
- System Analysis & Design
- System administration
- System Security
- E-Business
- Group decisions/Team building
- Presentations
- Others

The employers were asked to provide information on technical skills, employee personal skills and their experience with Millikin alumni. The responses are used to validate the data gained from the alumni in identifying our strengths and weaknesses. In addition, the employer responses will be considered in validating the results found in the third phase examination of opportunities and threats.

The examination of course offerings from our recognized peer and aspiration school serves as the basis for determining our MIS program opportunities and threats. We identified 21 peer and aspiration programs to evaluate. We classify a peer school as one located in the Midwest, with a full time student enrollment approximately the same size and enrollment in their business program, as Millikin. The aspiration schools are those with programs which have larger enrollments and/or more varied program offerings. The results from this aspect of the study is to determine if a uniqueness could be identified in the Millikin course offerings or could be developed to satisfy an unmet need in the marketplace.

Results

Survey

A request to participate in the survey was delivered to 81 email addresses. The survey response rate for the survey was a respectable 42%. A distribution of responding alumni showed that 56% graduated within the last 5 years and 82% had graduated within the last 10 years. The responding alumni represented 18 different companies and primarily held non-management job positions.

The job requirements derived from the alumni sample show a preference for Visual Basic and JAVA skills, while skill requirement for COBOL and C++ are significantly less. The most interesting observation is that COBOL is used infrequently, with less than 16% of the respondents utilizing COBOL in their job assignments.

The alumni strongly believe MIS professionals should have knowledge of Object-Oriented programming and Web Programming. Approximately 66% and 75% of the respondents currently use Object-Oriented programming and Web Programming, respectively.

The alumni responses concerning Database Design and Management note a strong usage of these skills in the performance of their daily tasks. Alumni written responses relating to databases denote a need for additional skill development in Data Warehousing, CRM and Data Mining.

The System Management skills are considered necessary at various levels in the performance of the alumni current tasks. There appear to be a slightly greater frequency of use with System Analysis & Design and System Security. Networking is used periodically by more than half the respondents in the accomplishment of a task.

The Team Building skills used in making decisions in a group environment are highly regarded. The need for Presentation skills appear to be significant, though only half of the alumni are currently required to use them frequently. In the written responses, Program Management is regarded by alumni as a highly desirable skill.
 E-business is not used as frequently by the majority of the respondents but is a skill used periodically by most.

Ranking of Skills

The skill ranking question addresses several aspects regarding the importance of each skill towards the MIS curriculum. To establish the ranking of importance the mean and mode of the rankings provided by the alumni were computed. The skills were ranked in accordance with the resulting mode and mean values. An aggregate score is developed by averaging the mean and mode ranking. The final ranking of the skill relative importance was based on the aggregate score.

The ranking of importance revealed several interesting observations. First, the ability to work effectively in Group decision/Team building is clearly a key skill. This coincides with the highly scored responses on alumni skill requirements. The need for Object Oriented and Web programming skills are rated within the top five skills for importance. The aggregate scoring of the traditional core courses in the MIS curriculum are closely spaced, as such a definitive ranking of which has more importance to the respondents was difficult to determine. The one exception is the core course of System Analysis and Design. This core course is ranked second in aggregate scoring and is ranked first in the mean scoring. The System Analysis and Design aggregate score is higher than anticipated, as the frequently used and critical importance percentages noted in the first two questions were only just above half the respondents.

Regional Employers

Each employer is asked a series of questions regarding the topics on: Technical skill, Personal skills, and Current projects. Four employers were chosen to participate in this interview process. These employers represent a diverse set of industry sectors: Banking, Food Processing, Electrical Utilities and Insurance.

The industry responses on computer language and programming skills agreed with the alumni survey on the desire for MIS graduates to know Visual Basic and the alumni assertion of the near term industry movement towards VB.Net. The requirement for JAVA was somewhat mixed. Only the Utility Company uses JAVA while the other industries either do not or only occasionally. The minimal use of C++ by the industry respondents supported the alumni, as only the Insurance sector uses this language with any regularity. The one interesting observation was the extensive use of COBOL by three of the four industries. Further discussion revealed the use of COBOL is restricted to legacy systems which support systems with extensive databases that are considered to be too costly to convert. The Insurance Company and the Bank train new employees to support these systems whereas the Utility hires contract workers to support their systems. This apparent need identified by industry for COBOL, though on a restricted basis, contradicts the survey results. The only other computer language identified by industry was a limited use of PL1.

The industry desire for MIS graduates to have Object Oriented Programming and Web Programming skills is very positive. The Utility company and the Bank identify knowledge of OOP is a basis for success. Their opinion is OOP provides the graduate with a framework to learn another language and apply its principles much faster. The industries note a need for MIS graduates to have knowledge in HTML, XML and Dreamweaver to efficiently design, produce and maintain effective websites.

All of the industries interviewed cite the need for the MIS professional to have skills in Database Design and Management. The database tasks require the graduate to know how to structure the database and produce reports that support the user needs. To support these database skills the MIS graduate should be conversant in SQL and an appreciation for various IT intensive business applications, such as: Enterprise Resource Planning, Customer

Resource Management, Human Resources, and Accounting. These specializations are defined as the differentiating factor between the hiring of one graduate over another.   The skill unanimously agreed upon by each organization, as being highly valued was Project Management. The comments on the benefits of knowledge of Project Management ranged from "valued" to "a key component of success".

Each industry consider a valued MIS professional as one who can work in a team and relate to team members at all organization levels. Additional valued assets included the ability to handle conflict, demonstrate ownership of a project, and show confidence in the employee's decision making and problem solving skills. A successful MIS professional is described as one that can communicate an idea to all levels of management, in addition to being an active listener. The industry interviews cite highly developed presentation skills as key communication assets.

Peer and Aspiration Schools

The peer and aspiration programs either represents schools, which we compete for students or programs identified as leaders in the field and we believe are attainable in the near future. We reviewed the curriculum primarily located within the Midwest. The comparison takes into consideration three areas between the Millikin MIS program and the peer and aspiration computer focused programs.

First, our review of computer languages offered in the identified programs showed JAVA and COBOL were the most frequently offered. It is interesting to note only half of the programs offered these languages as an individual course or as an identified component of a related course. Visual Basic and C++ were found to be in approximately 38% of the curriculums reviewed. The most common Web Programming language was JavaScript found in 33% of the curriculums. The course offerings for HTML and VBScript were surprising low, 24% and 5% respectively. SQL is identified by 50% of the curriculums as part of their database management courses.

Second, the review of courses offered by peer and aspiration schools but not offered by Millikin showed that some universities have chosen to differentiate their MIS curriculums by offering Web programming, e-commerce and multimedia.

Lastly, a comparison of Millikin offerings to similar course offerings at other institutions identified commonality in the core MIS course: System Analysis, Database Design and Management and Networking. The area where few programs offered a corresponding course was in System Security. This latter finding is in contrast with the issues in both the popular media and technical journals. Further evaluation of this System Security question may warrant a separate study.

SWOT Analysis

Strengths and Weaknesses

The Millikin MIS faculty reviewed the results of this study and derived the current curriculum perceived strengths and weaknesses. Beginning with a review of computer language and programming, the faculty identified the wide use of Visual Basic in the MIS curriculum as a strength. The use of Visual Basic and the near term transition to VB.Net is perceived as positive, since it supports both the alumni and employer defined needs. The lapse in offering COBOL in the curriculum is considered a weakness. Though the response by the alumni did not demonstrate a requirement for COBOL, it is clear in conversations with regional employers their legacy systems support a decision to offer COBOL more frequently. The MIS faculty agreed to begin offering COBOL on an annual cycle, as they believe this change will better serve our students and industry needs.

The study highlighted the necessity for the MIS graduate to have a through knowledge of Object Oriented Programming (OOP). The MIS faculty's internal review found OOP is being taught as a component of a freshman course in introduction to computer programming. This introductory class also introduces the student to JAVA. Students without prior exposure to programming have commented on their struggle with the course, which emphasizes JAVA with OOP as an ancillary objective. To address this weakness, the MIS faculty has developed a separate OOP course.

The lack of a Web programming course is considered to be a weakness in our current course offerings. The faculty has resolved this discrepancy by working with the Computer Science department to offer a Web programming by cross listing it with the MIS curriculum.

The project oriented approach used in System Design and Analysis courses corresponds to the feedback from alumni identifying hands-on projects as the most effective learning tool. A potential weakness is the lack of direction for the database projects. Current projects focus on the mechanics of the desired MIS topic without an understanding of how other business decisions are impacted. Collaboration with other business departments is required to address this weakness. Currently the MIS faculty is working with the Entrepreneurship program and other groups on campus to bring "real world" projects into the classroom.

Our review of other programs showed our offering of System Security class to be unique. A weakness in this area is the lack of a fully integrated lab to provide the required hands on experience. The faculty found the absence of an e-Business course to be a weakness, as both the alumni and regional employers note the need for this skill in both current and future MIS professionals. The alumni and employers identified the benefit of having a skill in project management. The MIS faculty recognizes project management as a beneficial skill. The Millikin Management department is developing a project management course, which will be considered for inclusion as an MIS elective.

The most agreed upon strength for our program and the business school in general is the integration of team building and presentations into the curriculum. The use of team

decisions and presentations can be found as a criterion in every class in the MIS curriculum and in most of the business school courses.

Opportunities for Success

The MIS faculty review of the market place has identified several potential opportunities to differentiate our program. These opportunities include 1) creating a linkage between MIS projects and other business majors; 2) developing a hands-on security course with an integrated lab; and 3) developing a hands-on networking course with an integrated lab.

The MIS faculty is in discussion with the accounting department to develop a project, which infuses both MIS and Accounting course requirements. The objective is to co-enroll a group of MIS and Accounting students in designated MIS and accounting courses. Each course will emphasize a unique aspect of a shared project. The benefit to the MIS student is in the direct application of MIS topics while the accounting student learns computer-based problems solving techniques.

The Millikin MIS faculty believes the design of a unique System Security course and integrated hands-on lab can be perceived as one of Porter's differentiating factors. This security lab will be isolated from the university system to prevent unanticipated interruption in normal university business. The students will be able to create security systems and review the approaches that are used to circumvent them.   This hands-on advantage applies to the development of a dedicated course in networking. Network architectures, applications, services, protocols, delivery methods and security will no longer be just something discussed in lecture but applied by each individual student in a real world hands-on environment.

Threats to the Plan

Our faculty review identified the principle threat as attracting, maintaining and developing faculty with the direct experience to lead the hands-on experiences, which we believe to be critical. The SWOT analysis provides the benefit of identifying not only the curriculum requirements but the strengths and weakness of the current faculty's ability to present the defined curriculum. Over the last several years the SWOT analysis has played a role in the hiring of new faculty by emphasizing areas improvement was necessary. This faculty issue is ongoing with no immediate response available.

Another shared threat experienced by many small universities is our ability to market those areas where we do excel and are unique. Once we have created a product that is beneficial we must make sure that all potential students know about these advantages.

Summary

To make true change to our curriculums requires using methods that provide a full understanding of what is being asked and forces an introspective look at how large a gap exists between these requirements and what our curriculum is providing. The use of SWOT produces not only an understanding of stakeholders needs but the potential impact by the competitive forces of similar institutions.

This study reaffirmed some previously held program beliefs but also produced some improvement areas, which prior to the study had not been considered. The alumni and employers survey responses on computer programming emphasized the need for a through understanding of Object Oriented Programming, Visual Basic, VB.net and Web Programming. The alumni responses and the employer responses differed on the need for COBOL and JAVA. The study affirmed the need for MIS students to have a strong skill set in Database Design and Management. The ranking of MIS skills by alumni highlighted System Analysis and Design as a key to a successful MIS professional. The personal skills of Group Decision and Team Building were perceived as being essential by alumni and employers to the effective MIS graduate.

The benefits of a SWOT analysis in this study were shown to be multifaceted by impacting not only course offerings but faculty appointments and assignments. The use of SWOT analysis defined our strengths from which we can build, our weaknesses from which we can improve, potential opportunities for which we can differentiate and threats for which we must be watchful.

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