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# Communications of the Association for Information Systems

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## Business School Undergraduate Information Management Competencies: A Study of Employer Expectations and Associated Curricular Recommendations

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### Abstract:

By focusing on those companies that currently partner with Northeastern University's College of Business Administration, this article provides an exploratory empirical study that examines employer expectations of undergraduate business school co-op students and graduates. My particular concern in this research is what IT competencies are valued by employers when evaluating students for initial co-op engagements and subsequent full-time employment assignments. I then consider the bearing of these findings on MIS curricular design and the associated classroom experience. Drawing upon a detailed survey of 111 employers of Northeastern University undergraduate business school students and subsequently on focus groups with representative employers from the study population, I have identified a clear pattern of current and anticipated expectations that suggest the need to rethink the current approach to classroom MIS content and delivery—both within MIS courses and throughout the typical business school curriculum.

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## I. INTRODUCTION

For decades, scholars and practitioners alike have explored the relationship between organizational success and the effective application of information technology (IT) to enable key enterprise business processes. The body of work that has emerged from these inquiries centers on the development of business leadership core competencies concerning IT selection, deployment, and support. At the same time, the undergraduate management information systems (MIS) classroom experience in many business schools tends to focus more on IT products than services. It may be argued that by refocusing MIS educational program delivery on the applied competencies of project scoping and management, team collaboration, self-directed business research and analysis, business data modeling, and analysis, and the like, educators would better prepare their students for what will be required of them when they transition from the classroom to co-op/internship assignments and eventually to full-time employment.

By focusing on those companies that currently partner with Northeastern University's College of Business Administration, this article provides an exploratory empirical study that examines employer expectations of undergraduate business school co-op students and graduates. My particular concern in this research is what IT competencies are valued by employers when evaluating students for initial co-op engagements and subsequent full-time employment assignments. I then consider the bearing of these findings on MIS curricular design and the associated classroom experience. Drawing upon a detailed survey of 111 employers of Northeastern University undergraduate business school students and subsequently on focus groups with representative employers from the study population, I have identified a clear pattern of current and anticipated expectations that suggest the need to rethink the current approach to classroom MIS content and delivery—both within MIS courses and throughout the typical business school curriculum.

This is not the first time that anyone has undertaken a study of MIS curricular requirements. Indeed, it would appear that with each major evolutionary change in the role of IT in the workplace, some professional organization or team of scholars has studied this question. For example, with the advent of personal computing in the early 1980s and the emergence of MIS as opposed to "data processing" as a job function, the first articles in this genre began to appear. [Nunamaker 1981], [Nunamaker, et al. 1982] In the 1990s when client server computing came to the fore, the Data Processing Management Association, the Association for Information Systems, and other professional bodies sponsored studies to better understand emerging skill requirements [Longenecker and Feinstein 1991; Longenecker and Feinstein (eds.) 1991; Nelson 1991; Leitheiser 1992; Couger, et al. 1995; Gorgone and Kanabar, 1997].

Similarly, the coming of the Internet raised a whole new set of requirements and hence curricular concerns, leading to further research [Davis, et al. 1997; Gorgone, et al. 1998; Lightfoot, 1999; Tang, et al. 2000-1; Ives 2002; Silva and McFadden 2005]. Most of the prior research on this subject focused upon the requirements for the training and development of MIS professionals, typically drawing upon input from the information systems (IS) faculty of representative institutions of higher education. While a few studies have collected the opinions of employers, almost all of the work to date centers on the appropriate MIS competencies for IT professionals rather than the broader business workforce, and few collect the views of business managers and professionals in the workplace. The few exceptions to this rule are noteworthy but they are also dated by over a decade [Trauth, et al. 1993; Lee, et al. 1995; Gonzenback 1998].

More recently John Gorgone, Paul Gray, and their colleagues on the joint ACM/AIS Task Force on graduate information systems curriculum have issued a substantial update [Gorgone, J. T.; et al. 2006] to their previous major review of IS curriculum issued by the task force in 1997 [Davis, G. B. et al. 1997]. This extensive study of current best practices globally provides a detailed framework and set of course descriptions for graduate training programs in information systems, reflecting a host of changes driven by globalization, the need to integrate IS within core business processes of the enterprise, and of course, the introduction of new technologies into the work place. In their subsequent presentation before the American Conference on Information Systems, members of the Task Force both summarized their finds and placed their curricular recommendations within a broader context that embraced both IS majors and other academic programs that strive to integrate MIS course with less technical more business oriented course work [Topi, Heikki, et al. 2007]. Where as in their research Thomas Abraham and company are less focused on a detailed consideration of MIS curriculum per se, and more concerned with other factors such as globalization and outsourcing that might impact both the quantity and nature of IS jobs in organizations around the world [Abraham, Thomas, et al. 2006]. It is noteworthy that though these works address a different student

population than the current article, they too are finding the need to bring more of a business process focus to MIS teaching.

To summarize my findings from an extensive search of the literature, I have found numerous studies, starting in the late 1970s all the way up to the present, that address in a rather extensive manner, the curricular needs of higher education MIS programs. In general, the work of my predecessors is both sound and well focused. Almost without exception, these authors address the curricular needs of students targeting information resource management (IRM) and/or information technology (IT) as their career objectives. In other words, the curricula under study in these articles were intended for prospective professionals. As such, the survey tools employed and the survey data collected focused almost entirely on the technical skills and competencies required for existing and emerging MIS roles in the enterprise. There is no fault in this, and indeed, any number of the works cited above and in the bibliography at the end of my article demonstrate the foresight of these authors in identifying the need for the coverage of client-server, Web-based, mobile computing, et al., subject matter in advance of a broad-based industry demand for these skills.

The current study takes a different tact. Rather than collect insights from academic colleagues or industry leaders concerning the curriculum requirements for MIS majors, I have turned exclusively to those very employers who regularly hire Northeastern University, College of Business Administration undergraduates for both co-op and full-time positions, that is to say business school majors of all types, not just MIS. My concern in targeting this broad population of business leaders is to better understand their needs and expectations concerning the IRM/IT competencies of the undergraduate students that they hire for any and all roles within their respective organization. As such the intention of my data gathering and this article are to ultimately inform the preparation of the typical business school student in IRM and IT. To that end, I have consulted hiring executives.

Furthermore, unlike its predecessors, my study and its survey population encompass all of those industries and job functions where Northeastern currently places students, regardless of their particular business concentration. By extending the scope of my inquiry in this fashion, the survey population reflects a healthy cross-section of work place settings and associated employer competency expectations for newly hired undergraduates. Though the sample of employers is localized, focusing primarily on organizations in the northeastern United States, this sample demographic does include a wide range of industries and job functions, including a significant number of global enterprises. As summarized following, these research data identify the needs of employers, a basis for prioritizing the learning objectives for the undergraduate business school curricular experience, and potentially, some direction in closing the gaps in the coverage of NEU's existing MIS course offerings. Based upon the findings of the survey, I suggest a series of next steps for how my institution and others might enhance the classroom experience to better address these needs.

Since its inception, Northeastern University's (NEU) education programs have focused on experiential learning and in particular the integration of cooperative education (co-op) work experiences with classroom teaching. Like the university's other academic programs, NEU's College of Business Administration (CBA) provides its undergraduates with a robust curricular offering as well as the opportunity to complete as many as three six-month co-op assignments with external employers as part of a five-year degree program. As part of the curriculum, all business school students are required to take a single management information systems (MIS) course—MIS U301. Typically, students register for this course during their sophomore academic year, prior to venturing out on their first co-op jobs. Unless, the student chooses a MIS concentration (a.k.a. major), where three additional MIS courses are required, MIS U301 constitutes the sum total of a student's formal course work in the MIS discipline. While many other disciplines, such as accounting and marketing, include a consideration of the role of IT systems as they apply to those subjects, one is obliged to ask if CBA's overall approach to MIS is sufficient in preparing students for future employment in highly informed and automated workplace environments. Furthermore, though it is not uncommon for a Northeastern undergraduate student to declare a dual concentration, only a small portion of the overall business school population choose MIS as the complement to a course of study in finance, supply chain, marketing, et al. Therefore for many, MIS 301 is their only formal exposure to the role of IT in the enterprise.

For those of us on the faculty responsible for the MIS curriculum, this concern in turn raises any number of other issues:

- Does the timing, content, and classroom delivery of the core MIS course address the needs of the student in preparing him/her for subsequent non-MIS business courses?
- Does the core MIS course adequately prepare the student for the IT challenges that he/she will face on that first and subsequent co-op assignments?
- Does this course offering address employer expectations concerning the MIS competencies of CBA undergraduate co-ops and graduates?

- Are the course offerings for MIS concentrators appropriately aligned with the needs and expectations of prospective employers who are looking for MIS majors?
- What if anything should the academic leadership within the business school do to incorporate additional MIS-related learning experiences into higher level non-MIS courses so as to better prepare students for both co-op and post graduate employment opportunities?

With the intention of addressing most of these questions—in whole or in part, I applied for and received a research fellowship from NEU’s Center for Work and Learning. Given the institution’s commitment to experiential learning and the alignment of course offerings with field-based best practices, it seemed at the time both appropriate and necessary that the MIS program establish a framework for assessing our current efforts based upon employer input. By surveying the employers of CBA undergraduate co-ops and graduates, the envisioned study would establish employer needs and expectations around student MIS competencies. The information gathered from the survey could then inform changes to the timing, content, and delivery methods of the school’s MIS curriculum, and perhaps other non-MIS course offerings as well.

## II. THE RESEARCH PROCESS

I began my exploratory empirical research by posing the following proposition:

By refocusing NEU/CBA MIS program delivery across the business school curriculum on the applied competencies of project scoping and management, team collaboration, self-directed business research and analysis, business data modeling and analysis, and the like, educators would better prepare their students for what will be required of them when they transition from the classroom to co-op/internship assignments and eventually to full-time employment.

In making this statement, I made the assumption that the possession of process and interpersonal skills are of more value to undergraduates entering the work force than hands-on knowledge of the IT hardware and software as typically deployed in business settings. To substantiate or refute this position, a survey tool was employed to systematically collect the views of employers who regularly assess the competencies of NEU students.

As a starting point to the project, I established three informal “boards of governance” to help guide him through his research and analysis efforts, and to provide him with advice and support throughout the process. First among these were the 2006/7 Fellows of the Center for Work and Learning at NEU. While each Fellow pursued his or her own research, we met monthly throughout the academic year to share our experiences and lessons learned. These collaborative exchanges proved invaluable during the formulation of my approach to data collection and analysis. Second, I turned to the two groups on campus with well-established relationships with the business community, namely: the College of Business Administration’s Co-op Coordinators, and the University Office of Employer Relations (formerly a department within Student Career Services). These staff served as my entrée into the survey population. Finally, I constituted a working group comprised of my MIS department colleagues whose primary role was to assist me in framing action items out of my research findings but who, in effect, assisted with quality control throughout the course of the project.

From the CBA co-op coordinators and the university office of employer relations, I received a complete list of active employers working with both NEU functions. The reduplicated list of employer contacts totaled 190 individuals, constituting the survey population. In addition, I asked the coordinators to provide a short list of representative employers, whom he might contact directly about the study. This initial group of 14 employers, drawn from different industries, corporate roles, and professional disciplines, served as my test population. In interviewing these employers one-on-one, my objective was to clarify:

- the role of these typical employers in student hiring (co-op and full-time);
- the nature of the employer’s knowledge of and commitment to the cooperative learning process;
- the history of that company’s relationship with the CBA co-op program;
- the questions I should ask of the employer population and how best to frame, phrase and order those questions; and
- their own particular views of business student MIS competencies.

From these interviews I developed a survey tool and employed the Web-based survey utility—[www.SurveyMonkey.com](http://www.SurveyMonkey.com)—to collect data from the larger employer population. The survey tool was organized to collect:

- respondent demographic data



- metrics on the depth of the organization’s commitment to NEU’s co-op program
- the corporation’s reasoning behind that commitment
- general selection criteria for choosing one co-op candidate over another
- specific responses concerning:
  - desired general business competencies of the student candidate
  - desired IT competencies of the student candidate
  - a more detailed drill-down on particular skill sets:
    - spreadsheets
    - database
    - programming

All three levels of project governance reviewed, improved upon, and eventually approved the survey tool for use. I then employed e-mail to communicate with his survey population. The first communication briefly introduced the nature of the inquiry, and the aforementioned research process. The second e-mail included a link to a Web site ([www.SurveyMonkey.com](http://www.SurveyMonkey.com)) where the survey tool was hosted. I asked all participants to respond within the next two weeks. During that time, weekly reminders were issued to all non-respondents. In the end, 111 employer respondents out of the original population of 190 returned completed surveys (i.e. a 58.42 percent response rate). At the close of this process, the data in SurveyMonkey was moved to SPSS for analysis.

My preliminary findings were again reviewed by project governance, who in turn raised a series of clarifying questions. With this feedback in hand, I ran a series of focus groups and one-on-one interviews with a representative sampling of survey respondents, approximately 15 percent of the total. The intent of these meetings was to clarify and supplement survey results with more qualitative feedback from population members. These conversations provide me with a deeper appreciation of the findings gleaned from the survey data.

### III. THE SURVEY POPULATION

In soliciting the views of 190 employers, I contacted virtually all enterprises with whom the Northeastern University College of Business Administration has recently placed undergraduate students. In many instances, the corporations in question regularly hire a number of NEU/CBA students each year and to facilitate this process have established a liaison role between their organization and the university. While many of these firms have a strong Boston or New York presence, nearly a quarter of the survey population represents national or global organizations. In no instance was a given corporation represented by more than a single respondent.

The distribution of respondents by industry reflects the nature of the regional business focus of the northeastern United States as well as the particular career preferences of NEU students. See Table 1.

<b>Table 1. The Distribution of Respondents by Industry</b>		
<b>Business Focus</b>	<b>Number of Respondents</b>	<b>% of total</b>
Consulting Services	12	10.81%
Finance and Insurance	35	31.53%
Information Technology	15	13.51%
Manufacturing	10	9.01%
Not-for-Profit	12	10.81%
Public Accounting	10	9.01%
Retail Sales and Distribution	6	5.41%
Other	11	9.91%
<b>Total Respondents</b>	<b>111</b>	<b>100%</b>

The financial service industry in the Boston/New York corridor attract many NEU students but so do opportunities in the area’s high-tech industries and its not-for profit sector (primarily hospitals and institutions of higher education). Nevertheless, the survey population represents a satisfyingly diverse collection of industries.

Similarly, the job functions of respondents reflect a wide range of corporate roles, responsibilities, and perspectives, again mirroring a cross section of with management population in these enterprises. See Table 2.

<b>Table 2. Distribution of Respondents by Job Function</b>		
<b>Job Function</b>	<b>Number of Respondents</b>	<b>% of total</b>
Accounting	14	12.61%
Finance	12	10.81%
General Management/Administration	8	7.21%
Human Resources	33	29.73%
Information Technology Services	13	11.71%
Marketing	6	5.41%
Operations	6	5.41%
Research and Development	5	4.50%
Sales	5	4.50%
Other	9	8.11%
<b>Total Respondents</b>	<b>111</b>	<b>100%</b>

Within these job junctions, the survey population includes three distinct hiring roles vis a vis undergraduate applicants. See Table 3.

<b>Table 3. Distribution of Respondents by Management Role</b>		
<b>Role</b>	<b>Number of Respondents</b>	<b>% of total</b>
Executive Management	32	28.83%
Line Management (Direct Supervisor)	44	39.64%
Human Resources	35	31.53%
<b>Total Respondents</b>	<b>111</b>	<b>100%</b>

In some instances the hiring role for co-ops and newly minted undergraduates falls to corporate human resources as the surrogates for the line managers. Other organizations involve the line managers more directly in the hiring process. The survey population includes representatives from both of these roles as well as that of executive manager, typically the person serving as the liaison to NEU/CBA. They players have a broader understanding of the relationship between their firm and the recruiting process with Northeastern University.

It is also interesting to note that 27 percent of the survey population (30 respondents) are NEU graduates themselves and a further 21 percent (23 respondents) come from other universities and colleges that offer co-op or some other form of experiential learning opportunity along side more traditional course work. Only 4.5 percent of respondents have never hired NEU co-op students, whereas 58.6 percent of respondents hire three or more co-ops per year, and 10 percent hire as many as eleven or more co-ops per year.

All in all, this study's survey population includes respondents drawn from a diverse set of industries, job responsibilities, and management perspectives. The one attribute that they largely share in common is a commitment to improving the undergraduate learning experience as demonstrated by their long-term partnership with NEU's co-op program. However, perhaps what is most interesting in considering the demographics of these survey respondents is that despite the wide range of business focuses and work experiences represented by this population, they have responded to the survey tool with striking consistency. More specifically, in running

significance tests against their respective patterns of response, I could not identify any noteworthy differences by industry, job function, or management role, save one — that small subset of the survey population who were information technology managers expressed a strong preference for students with programming skills. Thus, the survey findings as summarized below reflect the views of the study’s sample population but in no significant way align with their respective demographics. Put in a more positive light, these survey outcomes reflect broad, cross-industry and cross-job function expectations concerning desirable student competencies and skills.

#### IV. SURVEY FINDINGS

When asked why their organizations participate in NEU’s co-op program, the consensus among the respondents is that the co-op process enables the cost-effective identification, assessment, and retention of prospective full-time employees. The distribution of responses to this question may be summarized as follows (range: not important = 1; extremely important = 5). See Table 4.

Reason	Not Important	Somewhat Important	Important	Very Important	Extremely Important	N/A	Mean Score
as a cost-effective staffing mechanism	5	17	30	33	19	2	3.42
as a cost-effective recruiting mechanism	8	16	29	32	19	2	3.37
to develop, cultivate, and observe prospective full-time hires	7	12	14	36	36	1	3.78
as a community service	19	28	30	14	9	6	2.66
to help Northeastern	17	22	36	21	9	1	2.84
to contribute to the student’s learning	2	9	24	32	38	1	3.91
Total Respondents	106						

In clarifying their responses to their rating of “to contribute to the student’s learning,” employers explained that they understood their obligation here to be “to educate the student about our industry and associated job opportunities so as to develop their interests in joining our organization post graduation.” Thus, the intent of this response reinforces the employer focus on prospective employee conversion. Similarly, the strong preference among respondents (58.5 percent) to recruit upperclassmen into co-op roles is because it is more likely that a co-op assignment in the junior year can be converted more successfully into a full-time hire upon graduation.

The next series of survey questions explored the overall selection criteria used by respondents in choosing a student for a co-op assignment. Here the responses follow several common strands. First and foremost, employers are looking for students who show a capacity for and an interest in learning on the job and in growing their skills. As a related set of traits, employers are looking for students with maturity and strong work ethics, a willingness to dig in and get the work done. Last but not least, they are looking for strong interpersonal skills, including the ability to work as part of a team or as a self-directed worker (this is where maturity enters in), to communicate effectively in written and oral forms, and to solve problems (as part of a team and individually). The survey findings bear this out (range: not important = 1; extremely important = 5). See Table 5.

It is noteworthy that the grade point average of the student as well as the courses he/she has taken received the lowest preferential scores. In drilling down on these responses, both the survey data and subsequent employer focus group information indicate that the student’s ability to learn on the job is much more critical than what has been learned by the student academically. In terms of problem solving skills, respondents are looking for students who can quickly grasp the issues and ask relevant clarifying questions. They also expect the student to demonstrate ability in collecting data, typically operating independently, to address the problem at hand (a 4.31 preference rating on a 5 point scale) and then to bring those findings back to the team for processing (a 3.98 preference rating). The associated interpersonal skills that align with such a role also emerged as strong employer preferences:



- collaborate as part of a team — 4.52
- communicate orally — 4.44
- work as a self-directed individual contributor — 4.21
- communicate in writing — 3.98

**Table 5. The Primary (High-Level) Selection Criteria in the Hiring of Co-ops**

Reason	Not Important	Somewhat Important	Important	Very Important	Extremely Important	N/A	Mean Score
ability to learn	0	1	5	33	60	0	4.54
willingness to learn	0	0	6	22	71	0	4.66
problem-solving skills	0	0	12	39	48	0	4.36
diversity	8	10	36	21	19	3	3.34
functional/academic knowledge of the field/business	5	20	33	32	8	1	3.18
grade point average (GPA)	3	21	44	25	5	1	3.08
interpersonal and communication skills	0	1	10	43	44	1	4.33
knowledge of applicable information technologies	0	16	35	32	14	2	3.45
maturity	0	1	7	42	49	0	4.40
work ethic	0	0	4	25	69	1	4.66
Total Respondents	99						

When asked how they assessed these attributes in student applicants, almost without exception employers indicated that they used the overall interview process and the resume and other written work as submitted to determine the student's communications competencies. As for measuring teamwork, problem solving, and self-directed individual-contributor skills, most survey respondents employ a combination of methods:

- behavioral interviewing techniques where the student is asked to demonstrate a competency based upon past activity/accomplishment ;
- situational problem solving where the student is asked to address a problem based upon what he/she has faced in his/her past work experience ; and
- and/or in rare instances formal diagnostic.

The remainder of the survey tool focuses on employer ratings of the relative importance of particular information technology competencies on the part of prospective student hires. These responses identify a series of preferences that complement the more general profile previously summarized. For example, when asked about their interests in various categories of MIS learning, respondents indicated at best only a modest interest in the following topics (range: not important = 1; extremely important = 5):

- information technology (IT) concepts in a business context — 3.25
- knowledge management — 2.83
- systems integration — 2.64
- the strategic impact of IT — 2.62
- business process design and reengineering — 2.48
- supply chain management — 2.22

And in terms of particular IT competencies, employers responded as follows:

- spreadsheets — 3.97
- word processing — 3.84
- database management — 3.21
- knowledge of operating systems — 2.98
- knowledge of communications systems/networks — 2.85
- systems analysis — 2.83
- graphic design/presentation — 2.74
- Web tools/programming — 2.61

In summary, employers expect business school students to possess a general appreciation for the role of MIS in the workplace, but they do not expect a deeper understanding of more specialized topics, such as systems integration or business process design. While they take as a given intermediate-level skills in such general productivity tools as Microsoft Word, Excel and PowerPoint, Internet Explorer and Outlook, they do not expect a more technical basis of IT knowledge unless the job opportunity under consideration resides within the IT function of the organization. On the other hand, a number of employers did suggest that the university do a better job of educating students around proper business etiquette and communication standards in the use of e-mail and instant messaging. It would appear that student familiarity with and informality in using these tools has trickled over adversely into their workplace use of same.

Surprising, from my point of view, survey respondents do not highly value prior hands- on experience by students with typical information systems found within the enterprise, even when the specific products are currently deployed in that office (range: not important = 1; extremely important = 5):

- Web services and programming tools — 2.55
- specific prior knowledge of firm's own systems — 2.13
- accounting software — 2.12
- customer relationship management software — 2.04
- business intelligence/decision support software — 1.93 enterprise resource planning software — 1.87
- statistical packages, like SPSS or Minitab — 1.81
- supply chain management software — 1.61

These preference scores represent a sense of indifference among respondents. When asked why they answered in this manner, without exception employers responded that they expected to train any new employee on in-house information systems once that person was hired. Rarely was an employment decision made based on prior information systems experience.

On the other hand, electronic spreadsheet and data management competencies emerged as the areas of greatest need and concern among the survey population. For example, in terms of spreadsheet skills (rated highest in importance with a 3.97 of 5 preference score), employers clearly want to raise the bar on what capabilities their co-op hires bring to the workplace. Among respondents, 32.7 percent expect students to have mastered the use of analytical functions and data presentation capabilities of Excel; 17.4 percent expect knowledge of Excel's business intelligence and decision support capabilities; while only 6.1% of employers do not consider spreadsheet knowledge relevant to their work.

Similarly, 71.4 percent of all survey's respondents want students to have a basic knowledge of database management and the skills to query a database and extract database reports. Interestingly, functional departments as diverse as marketing, accounting, and manufacturing operations all stressed the need for higher levels of data management expertise on the part of business school students and graduates. On a related theme, while respondents overall did not see an immediate need for exposure to large enterprise resource planning (ERP) systems, many did mention the growing importance of student experience in working with and manipulating very large bodies of data. Within five years, these same respondents speculated, hands-on ERP experience will be a must. This finding may appear to contradict other survey results concerning hands-on knowledge of systems. However, when one appreciates that the emphasis here is on data management rather than systems knowledge, these comments complement other survey responses.

Finally, the survey reveals that employer expectations around the project management knowledge of co-op students and new hires are modest. While nearly 90 percent of the study population involve students in project teams, they do not assign them leadership roles that would require a more detailed knowledge of project management methodologies. More typically, they operate as individual contributors carrying out assignments on behalf of the

team and then reporting back to more senior team members. As with most systems knowledge, employers expect new hires to learn their company's project management processes on the job. However, these same employers look for a solid set of teamwork and interpersonal skills that will enable success in project-based work. They also expect students to quickly grasp the nature of roles, responsibilities, and performance metrics within project delivery teams.

## V. LESSONS LEARNED AND FOLLOW-UP ACTION ITEMS

In summary, the results of the survey suggest that business school MIS training needs to move toward a greater focus on related people and process skills and away from a detailed consideration of specific IT products and services. At the same time, we need to find ways to introduce more practical work experience with spreadsheet and database tools and overall a more concentrated effort to engage students in the management of large and complex datasets as part of their in-class learning experiences. Finally, while students are exposed to a great deal of group work, an independent study of group-work learning at NEU/CBA as well as my own work suggest that much more needs to be done here to make the outcomes of these experience more like those in a real-world workplace.

During 2007, a Northeastern University undergraduate student team, under the supervision of Prof. Leonard J. Glick, presented the faculty of the College of Business Administration with a study that identified shortcomings in some of the current learning practices around group work within the business school. The changes recommended by this team reflect a need to make group assignments at Northeastern operate as if they were team assignments within a actual business demonstrating the best collaborative work practices, including the use of more clearly defined roles and responsibilities, team performance metrics, issue management, and the hands-on mentoring of team members by senior management [Glick 2007]. These recommendations complement the conclusions drawn from my own analysis of employer requirements. To conclude this paper, I will explore in turn each of the themes that run through these findings.

### Preparing Students to Effectively Present Their Competencies to Employers

The survey data and especially the follow-up meetings with employer focus groups made it clear that we need to do a better job in preparing students to more effectively convey their skills and experiences prior to and during the actual interview process. In making this observation, I am referring to both immediate and long-term steps to improve the student's marketability. This focus also curricular implications for what business schools emphasizes — both in the classroom and in student orientation programs prior to interviewing for co-op positions and full-time work opportunities. Following is a list of student action items that come to mind:

1. Take pains to ensure the quality, clarity, presentation, accuracy, and comprehensiveness of the resume. Documents of poor quality will disqualify students from competitive opportunities.
2. Study and master proper business etiquette and form in the drafting of e-mail and instant messaging communications.
3. Prepare for and practice behavioral interviewing.
4. Think through and develop coherent narratives based on past employment, extra-curricular, and especially community service experiences. Do not underrate the value of these narratives in demonstrating to prospective employers past life/work experiences and how these reflect on ones maturity, work ethic, collaborative skills and teamwork, and ability to operate as a self-directed contributor.
5. Master Microsoft Office at the intermediate level and take advanced training courses in both Excel and Access.
6. Whenever the opportunity arises, apply ones Excel and Access expertise to class or co-op-related data analysis assignments.
7. Whenever the opportunity arises, involve oneself in group/project management assignments that offer exposure to the various roles within the team as well as overall team coordination and performance management.

In these ends, business schools need to more directly support these efforts. For example, as part of the required course of study for Northeastern students, CBA Co-op Coordinators provide a one-credit session on "Preparing for the Co-op Experience." This sophomore offering includes a general orientation to the cooperative learning process as well as practical training in resume preparation and interviewing best practices. In meeting with the CBA Co-op coordinators, I have recommended that they further enhance their course in line with his findings. In particular, the student will benefit from a more focused emphasis on items 2-4 cited above.

With regard to point 5, a number of years ago Northeastern, like many other colleagues and universities offered courses in Microsoft Office suite and the like. These courses typically addressed skill needs at an elementary level. As students have come to use these tools in high school and even grade school, this type of learning at the college

level has become superfluous. On the other hand, Northeastern students may take non-credit classroom and online courses in the more advanced uses of Excel, Access, various Web tools, et al., through the campus InfoCenter (sponsored by central IT services). None of these offerings are required for graduation and therefore few students take advantage of them. Clearly this would change if — as outlined in points 6 and 7 above — the CBA faculty insisted on a higher level of Excel or Access competency in their classes and if they employed collaborative and project management tools in group work assignments. Unfortunately current classroom practices do not necessarily push the students in this direction.

### **Making Changes to Business School Offerings - Reshaping the Student Experience**

As such, the time has come in this discussion to consider what the college itself needs to change to better address employer expectations and therefore student needs in this space. To start, here is my list of recommendations as driven by the evidence emerging from his study:

1. Promote the noncurricular study of Microsoft tools but also more thoroughly integrate these tools (and especially Excel and Access) into business problem-solving exercises and group assignments across the CBA curriculum.
2. Orient MIS U301 away from a focus on technology products and services and toward a business problem-solving, team-based approach to the study of management information systems.
3. Introduce a required data analysis module into the CBA undergraduate curriculum as either a standalone course or preferably as a learning component within any number of higher-level CBA courses, in such fields as accounting, marketing, operations management, and supply chain management.
4. Consider how the undergraduate program could accommodate training in and hands-on exposure to large-scale data set manipulation and analysis tasks, possibly in conjunction with hands-on work with an enterprise resource planning (ERP) system.
5. Promote the use of more IT-enabled group work and collaboration as a learning mode throughout the CBA curriculum and also incorporate those changes in group learning that were recommended in the recent student study of group learning practices within CBA.

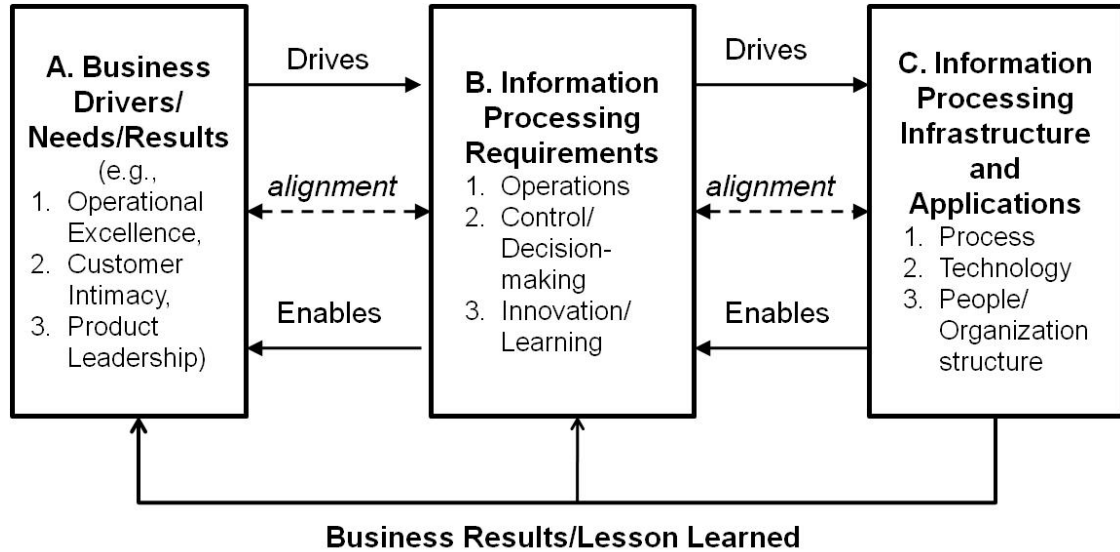
The fact is that with all the requirements dictated by external standards organizations and the university itself, it is unrealistic to think that CBA can add a course to the core curriculum or even reshuffle its existing offerings to address the gaps identified in my study. Instead, as the aforementioned recommendations suggest, the college faculty could make certain adjustments in approach that will in sum significantly address these issues.

For example, it is a well-established fact that people best retain their knowledge of personal productivity tools, like Excel and Access, through regular use. At present neither of these tool sets gets enough play within the curriculum to make a difference. Indeed, even at the graduate level it would appear that Excel and Access are by and large employed to present small data sets for rudimentary analysis and not as part of more extensive forays into business intelligence management and decision support processes. The university might provide specialist assistance, perhaps with input from an employer panel, as to how to restructure assignments to make more extensive use of analytical tools in managing larger bodies of data. Similarly, it might prove practical to teach some course units where Excel or Access is the medium through which “experience” with the content of that unit is achieved. Overall, course content will remain the same but the learning process will include the regular use of computerized tool sets to organize, analysis and present data.

In making changes typical the core MIS course (MIS U301) for all business school undergraduates, the author and his MIS colleagues generally recognize the challenged posed by the relative immaturity of experience among the students who take this course. We recognize the need to build a richer business context into the delivery of course content and have the opportunity to take direct action on this front. To that end, the MIS faculty at Northeastern have begun the process of transforming the core MIS course to more of a lab-based learning experience centered around the needs of the enterprise and its core business processes. Our intention is to introduce MIS topics by looking first at how and why organizations function the way they do and then calling upon the students to derive the information resource management and IT system requirements associated with those business processes. To frame this approach, we have developed a business-driven pedagogical model for MIS course delivery. See Figure 1.

This model begins by recognizing that each enterprise defines itself in terms of a particular strategic focus or competence, as previously discussed at length by Michael Tracy and Fred Wiersema, namely one of the following: (1) operational excellence, (2) customer intimacy, or (3) innovation and product leadership [Tracy and Wiersema, 1997]. This strategic focus in turn drives the organization’s information processing and management requirements as these relate to operations, control and decision making, and innovation and corporate learning. These requirements then drive the organization’s choices in business process design, the acquisition and deployment of IT,

and the corporation's human resource and organizational structures. Closing the loop, this set of choices enables enterprise operations, control, et al., which in turn enable the enterprise's overall strategy view. For the organization to function, its strategic processes and IRM/IT investments must all align. In teaching MIS in this manner, we will work to expose these relationships for our students through the use of short, focused case studies that provide useful business contexts within which to address particular course content and to stimulate student engage with what may otherwise appear to be distant, abstract terms and concepts. We intend to supplement these classroom activities with hands-on exposure to representative enterprise information systems, including those for supply-chain management, sales force automation and business intelligence/decision support. We expect to pilot this approach to MIS U301 in the summer of 2009.



**Figure 1. A Framework for Teaching MIS**

For those students with a concentration in MIS or a dual-concentration that includes MIS, the redesign of the core course has also influenced higher level IRM/IT learning experiences. For example, MIS U403, the data management course, until this year focused on traditional database administration. However, beginning with the spring 2008 term, this course was reengineered to focus on a series of business cases and the hands-on construction of data management and decision support system solutions to address specific business needs. As part of the learning process, students must first come to an understanding of the real-world issues that a particular system must address and will then proceed through the design, testing, and presentation of solution sets to business stakeholders. Similarly, the capstone MIS course (MIS U501) requires that students operate as cross-departmental teams within a simulated business, developing and deploying IT-enabled solutions for the enterprise. In each of these two cases, students use real IT tools, work in assigned teams, and experience the travails of inter-personal and team collaboration, and project management. Over time, the aforementioned MIS teaching framework will embrace all graduate and undergraduate MIS course delivery at our university.

Moving next to points 3 and 4, the junior year (which is actually the student's fourth of five years as a NEU undergraduate) would be the ideal time to inject an exposure to ERP systems and the management of large data sets, building on those experiences in the revised MIS U301 course. The reality in today's workplace is that whatever ones industry and job function, data management plays a key role. It is in the junior and senior years that the student typically focuses on advanced level courses within his/her major concentration. But to create an appropriate data management learning environment within various classroom settings poses a two-fold challenge. On the one hand, many faculty will need the assistance of a technical specialist to assist them in establishing the appropriate data management environment that aligns with their particular course content. On the other hand, each application will need access to a large body of usable data that is typically found only within a corporate ERP database. Neither of these barriers is trivial nor are they insurmountable.

Most universities possess an academic computing group who could work with properly motivated faculty members to establish the appropriate IT environment in keeping the course data management needs. With more traditional computer labs and the recent introduction of mobile laptop computer labs, the facilities are in place to support such a move. These same people working with corporate partners of the university could also establish pseudo data sets to run in these new classroom settings. None of this will be easy or without cost but it is doable so long as there is a general appreciation of the value in doing so. As for incorporating these tools and facilities into particular classroom

and lab learning experiences, subject matter faculty in marketing, finance, accounting, et al., could work in collaboration with their MIS department colleagues to structure assignments around these new resources. In the end these efforts will add a rich layer of student hands-on activity within the context of a particular business discipline of interest to that student. This scenario would also afford additional opportunities for students to employ spreadsheet and database tools in executing class assignments.

Finally and in general, the business school's approach to group work needs to be more like team management processes in the work place. The changes recommended here reflect my own views but are supported by a recent student project that analyzed group work at Northeastern University [Glick, 2007]. First, group work assignments need to be more rigorously structured through a formal chartering process that clearly defines the respective roles and responsibilities of team members. To this point, the professor might require of each work group a list of "start-up" deliverables, including: a launch document or charter, a timeline with milestones, and clearly defined roles/assignments for those on the team. The professor can mentor this process and provide illustrations of best practice without actually managing the underlying activities. Secondly, group work processes must be accountable throughout and not just at the time of the final team deliverable. As such the process should involve interim measurement steps to ensure that the team is achieving their plan milestones. Other metrics drawn from appropriate business-based examples might apply as well. Third, group work within CBA courses must include a problem resolution process where team conflicts are vetted and where the professor assists the students in addressing any outstanding issues. The set of process skills learned in this fashion will position students for productive roles in both co-op and full-time work assignments going forward.

Returning to the questions posed at the outset of this paper, my findings do suggest some at least partial answers and potential solutions:

*Does the timing, content, and classroom delivery of the typical core MIS course address the needs of the student in preparing him/her for subsequent non-MIS business courses?*

Not entirely. Sophomore year is a great time to begin a conversation with business school students about the role of MIS in the business but that conversation requires continuous application and reinforcement in subsequent curricular offerings and student learning activities.

*Does the core MIS course adequately prepare the student for the IT challenges that he/she will face on that first and subsequent co-op assignments?*

Clearly we are making progress in this direction but we still have a ways to go. We need to provide more rigorous, real-world team experiences, more hands-on, advanced-level use of Access and Excel (or similar tools), and at least some exposure to working with and analyzing large bodies of data.

*Does this course offering address employer expectations concerning the MIS competencies of CBA undergraduate co-ops and graduates?*

Clearly not, for the reasons mentioned earlier.

*Are the course offerings for MIS concentrators appropriately aligned with the needs and expectations of prospective employers who are looking for MIS majors?*

Increasingly, the answer to this question is yes for faculty of NEU's Information Operations and Analysis Group (the organization within which MIS resides) because we are reengineering our course offerings to better align with and address the findings in this study. However, the vast majority of our business school students do not take these courses and must therefore find other non-MIS course opportunities to build these competencies.

*What if anything should the academic leadership within the business school do to incorporate addition MIS-related learning experiences into higher level non-MIS courses so as to better prepare students for both co-op and post graduate employment opportunities?*

Here too things can be done but these action items do pose a challenge because the types of activities that I would advise run contrary to the way many business schools operate today, including more interdisciplinary teaching, the greater integration of MIS content in non-MIS courses, the use of more rigorous team-based learning activities, and the availability of just-in-time tools training in line with the use of these tools in the classroom.

As the reader can appreciate, the action plans outlined above come at a cost. The good news is that they do not require any major changes to the college's curriculum or the content covered within courses. Nevertheless, they do call for an investment in the redesign of particular co-op and academic course offerings, the establishment of a fairly robust data management capability and related infrastructure as part of other courses, and most importantly the ongoing collaboration among of various business school disciplines, the university's IT organization and the college's co-op coordinators. Periodically, CBA needs to reconnect with employers to learn how their own thinking in these matters has evolved as well as to gather intelligence regarding our progress in closing the gaps that exist today between the business world's need for information works and academe's delivery of appropriately skilled students. As a set of next steps, I hope to convene a working group that will lead to more concrete recommendations and the piloting of changes to co-op and MIS educational offerings. In addition, I will initiate discussions with NEU/CBA leaders that might serve to open doors concerning the larger effort around integrating data management and group work into upper level courses.

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## APPENDIX: THE MIS STUDY SURVEY QUESTIONS

Question	Drop-Down Menu Options
1. What is the business focus of your organization?	
2. What is the size of your organization?	
3. How long have you been with the organization?	
4. What is your current role within your organization?	<ul style="list-style-type: none"> <li>Executive Management</li> <li>Line Management (Supervisor)</li> <li>Human Resources</li> </ul>
5. What is the function/focus of your current job?	
6. How long have you been in your current job?	
7. Did you graduate from Northeastern University?	
8. Did you attend another university that offered cooperative education (co-op), internships, or other practice oriented education experiences?	
9. Does your organization regularly (at least once a year) hire Northeastern Business School co-op students?	
10. How would you rate the importance of the following reasons for participating in Northeastern's Undergraduate co-op program?	<ul style="list-style-type: none"> <li>as a cost-effective staffing mechanism</li> <li>as a cost-effective recruiting mechanism</li> <li>to develop, cultivate, and observe prospective full-time hires</li> <li>as a community service</li> <li>to help Northeastern</li> <li>to contribute to the student's learning</li> </ul>
11. On average, how many <i>undergraduate</i> co-op students does your organization hire per year?	
12. What is your preferred year-in-school for the hiring of undergrad co-ops?	
13. To what degree is your year-in-school preference based upon one or more of the following criteria?	<ul style="list-style-type: none"> <li>courses taken prior to coming to work for us</li> <li>maturity of the student</li> <li>prior co-op experience of the student</li> <li>retention for a second co-op</li> <li>retention for full-time employment</li> </ul>



14. Do you typically prefer past co-op hires when filling a full-time, entry-level staff position?

15. In selecting an undergraduate student for a co-op position within your organization, rate your selection criteria from "1" for unimportant to "5" for extremely important:

- willingness to learn
- problem-solving skills
- diversity
- functional/academic knowledge of the field/business
- grade point average (GPA)
- interpersonal/communications skills
- knowledge of applicable information technologies
- maturity
- work ethic

16. When considering the problem-solving skills of the co-op candidate, rate the importance of the student's ability to:

- understand the issue and ask relevant questions
- establish a framework/model for analysis of the problem
- gather the data relevant to addressing the problem
- solve the problem
- implement the solution

17. When considering the co-op candidate's interpersonal/communication competencies, rate the importance of the student's ability to:

- communicate - orally
- communicate - in writing
- collaborate/work as part of a team
- demonstrate leadership
- work as an individual contributor/be self-directed

18. How important is an understanding

- IT concepts in a business context
- business process design and reengineering
- knowledge management
- supply chain management
- systems integration

19. When considering the co-op candidate's information technology competencies, rate the importance of:

- database management skills
- graphic design/presentation skills
- knowledge of operating systems
- knowledge of communication technologies and networks
- spreadsheet skills
- systems analysis skills
- Web tools/programming skills (i.e. HTML, JAVA, Visual Basic, XML)
- word processing skills

20. Is it *important* that the student have hands-on exposure with any of the following types of systems?

- accounting software
- business intelligence/decision support systems
- customer relationship management (CRM) software
- enterprise resource planning (ERP) software
- statistical package, such as Minitab or SPSS
- supply chain management (SCM) software
- Web services and programming tools, such as HTML, JAVA, XML

21. What are your expectations concerning a co-op student's prior knowledge of your own IT systems/processes?

22. For spreadsheet tools, what level of competence is strongly preferred?

- a basic understanding of spreadsheet operations
- an understanding of formulas and graphs
- an understanding of functions
- an understanding of data analysis/business intelligence capabilities
- not applicable

23. For database tools, what level of competence is strongly preferred?

- a basic understanding of database operations
- an understanding of database querying and reporting
- an understanding of data modeling and database design
- not applicable

24. Do you involve co-ops in project teams and if so, in what capacities?

- observer
- administrative support
- business analysts
- business process/solution system designers
- no

25. Do you involve co-ops in desktop support, and if so, in what capacities?

- yes, for operating systems and personal productivity tools (e.g. MS Office)
- yes, for operating systems, personal productivity tools, network connectivity, and security
- yes, for all of the above and for enterprise application integration
- no
- not applicable

26. Would a student benefit from a course in computer programming prior to his/her co-op assignment?

yes, just some general exposure  
yes, training in a specific language such as Visual Basic,  
C++, JAVA or XML  
no  
not applicable

27. Would a student benefit from a course in business analysis and process design prior to his/her co-op assignment?

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