IT IN EDUCATION

A new course focuses on managing the IT enterprise in a modern organization, paying particular attention to effective communication.

Jay Liebowitz

Teaching the Importance of Communication in IT

Many IT employers complain that their employees, especially new graduates, have a solid technical background but lack adequate oral and written communications skills, a critical attribute.

Phil Pfeiffer studied 15 firms and found that communication skills are a key requirement for employers (P. Pfeiffer, "What Employers Want From Students," Association for Computing Machinery, http://www.acm.org/membership/student/emplymntart.html). In his study, communications skills include

- possessing strong written and spoken English,
- helping customers understand their requirements,
- asking questions (for example, in an interview situation),
- responding to questions quickly and concisely,
- establishing trust with the customer, and
- clearly illustrating a system's purpose.

John Rossheim writes that having management and communications abilities, knowing how to work as part of a team, and pos-

sessing a keen sense of business ethics are less-tangible skills that nearly all employers desire (J. Rossheim, "The Skills Gap and the American Workforce," (http://featuredreports.monster.com/laborshortage/skills). The IEEE-USA echoes these findings by stating, "Underlying all of this is the need to develop the critical, analytical, communications, and problem solving skills that people need to succeed in a fast changing, technology driven workplace (IEEE-USA, "Testimony on Educating Our Workforce With Technology Skills Needed To Compete in the 21st Century," http://www.ieeeusa.org/forum/POLICY/1998/98mar24.html).

Communication skills are crucial for a successful IT career. Many IT students feel they must only know the nuts and bolts of their profession. But to move up the ranks of management, and even for those more interested in the technology side, proper communication skills are essential. For example, to gather user requirements or be the liaison for translating the technology jargon into something that management will adequately understand, communication skills play a key role. Educators can integrate communication skills into an information systems core course to provide cohesion within the IS discipline.

INTEGRATION IS A CRITICAL PART OF THE LEARNING PROCESS

Already, universities have established programs to emphasize the "integrated" learning process, such as those at the College of Integrated Science

Professional and Accrediting Graduate Information Systems Models

AACSB Standards for Business Accreditation (http://www.aacsb.edu) includes an outcome-based approach to developing the curriculum to meet the strategic mission of the school.

ABET/CSAB Computing Accreditation Commission 2003-2004 Criteria for Accrediting Information Systems Programs (Undergraduate) (http://www.abet.org/cac_criteria) includes 12 semester hours of a broad-based core of fundamental IS material; the core materials must provide basic coverage of the hardware and software, a modern programming language, data management, networking and telecom, analysis and design, and the IS role in organizations; the program must stress theoretical foundations, analysis, and design.

IRMA (Information Resources Management Association, http://www.irma-international.org) includes courses such as the overview of IT and the relationship to business.

IS 2002 Model Curriculum for Undergraduate Degree Programs in Information Systems, (http://www.aisnet.com/Curriculum/IS2002-11-1.pdf) includes courses such as Personal Productivity with IS Technology.

IEEE Educational Activities Board (2001 criteria) for an **Information Technology Engineering Program** (http://www.ieee.org): Graduates of baccalaureate degree programs must demonstrate technical competence to design, implement, maintain and provide security of facilities involved with processing and transferring information; apply project management techniques to the facilities; and apply discrete mathematics, and probability and statistics in support of these facilities.

The MSIS 2000 (Master of Science in Information Systems) Model Curriculum (http://www.aisnet.org) includes Fundamentals of IS; IT hardware and software; programming, data, and object structures; financial accounting; marketing; and organizational behavior. It includes core courses in the areas of data communications, networking, project management, and policy and strategy.

The MSIS Web-Centric Model Curriculum at Bentley College and Boston University includes concentration prerequisites (such as financial and managerial accounting, financial analysis, and business communications); core courses (such as project management for Web projects); and Web-centric electives such as e-commerce marketing and e-customer relationship management.

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and Technology at James Madison University (which has close to 1,000 Integrated Science and Technology undergraduate students), Marshall University's Integrated Science and Technology program, Franklin W. Olin College of Engineering next to Babson College (so engineering and business programs can integrate), and elsewhere.

The College of Integrated Science and Technology at James Madison University states in its mission statement that the college's academic programs emphasize the development of students in three principal areas: problem-solving, communication, and sensitivity to context. The college seeks to prepare students "to recognize and understand scientific and technical developments, and to apply them creatively to the issues facing contemporary society" (http://www.jmu.edu/cisat).

The college states that its focus is to

- invert the learning progression of traditional science and technology by moving context and applications to early courses;
- integrate issues of global commerce, government studies, and business through instructional modules developed by faculty of many disciplines;
- define new bachelor of science and master of science degrees that integrate the areas of science, engineering, computer science, knowledge-based studies, management, analytic methods, and liberal studies; and
- identify the importance of science and technology in the context of social needs and issues throughout the curriculum.

Various IS, MIS, and computer science-related professional societies and accreditation bodies have established criteria for accrediting IS programs (D.K. Lidtke and G.J. Yaverbaum, "Developing Accreditation for Information Systems Education," *IT Professional*, Jan.-Feb. 2003, pp. 41-45). Oral and written communications skills should integrate with IS knowledge. The Professional and Accrediting Graduate Information Systems Models sidebar shows model curricula and criteria for several information systems programs.

NEW COURSE INTEGRATES IT AND COMMUNICATIONS

The Master of Science in Information and

Project 1: Developing Functional Requirements

Your CIO has just briefed you on an idea for a new product that the company wants to manufacture. The product is an automated movie selector that would be available on the Web and in computer kiosks in stores like Blockbuster, Best Buy, and other stores that carry videos, CDs, and DVDs. The idea would be to have a software program that would ask you a series of questions to help you select which movie would best interest you for rent/purchase on that given day. It would also feed into an inventory system to check the availability of the selected movies, so the consumer doesn't have to constantly peruse the stacks to see if the movies are there.

Interactive multimedia would be built into the program to show you excerpts from selected movies, hear what others thought about the movie (similar to an Amazon.com rating/preference scale), and other types of functionality. This program would be available in computer kiosks and via the Web.

Your CIO has asked you to develop a sound first cut of functional requirements for such a product. You have been asked to provide the functional requirements document for this product and submit it to the CIO by next week. The CIO has also asked you to be prepared to give a PowerPoint presentation of your findings next week.

Project 2: Moot Court Competition

Divide into three groups. Your task is to prepare oral arguments for both the affirmative (pro) and the negative (con) sides on the resolution, "Are qualitative research methods 'better' to use for IS research than quantitative methods?" Of course, you will need to define "better" as part of your analysis. You must perform outside research to provide evidence to support your reasoning.
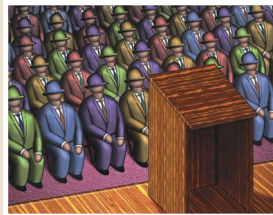
The moot court competition will proceed as follows:

➤ Each group must be prepared to argue each side (pro and con) for 30 minutes. Each member of the group must speak, and the group should provide a coordinated approach. On the day of the competition as class begins, we will draw straws to see which group will argue the pro side, which group the con side, and which group will be the judges.

➤ The pro (affirmative) side will present first for 30 minutes, with the judges asking questions afterward for 15 minutes. Then, the negative side can ask one question.

➤ The con (negative) side will then present for 30 minutes, with the judges questioning the group for 15 minutes afterward. Then, the affirmative side can ask one question.

➤ The judges will then go into deliberation for 20 minutes to decide who should win and why, and present their reasoning and verdict for 20 minutes. Both groups (affirmative and negative) can then ask questions to the judges for 15 minutes each.

The groups can then appeal to the Supreme Court judge, the course instructor, who will then offer his insights.

Telecommunication Systems (MS-ITS) for Business at the School of Professional Studies in Business and Education at Johns Hopkins University has graduated more than 1,200 master's students, and currently more than 700 students are enrolled there. The degree has 11 courses (assuming the student has met the prerequisites), and the last course in the program is called the IT Capstone Strategy course. This course involves working as a team with an organizational sponsor, faculty technical advisor, and the overall course instructor. Over the past 10 years,

the school has worked with about 250 organizations, and the projects serve as "mini-theses" for the students.

Responding to a decreasing quality of writing and presentation skills in the capstone course, the IT faculty has included various speaking and writing assignments throughout all the courses. This has helped reinforce the concepts of a new course titled "Technical Oral and Written Communications Skills for IT Professionals." The MS-ITS students must take this core course first as they begin their IT program.

This course integrates communications skills with IT-related areas. Despite some puzzled faces among the IT students learning this material in an IT curriculum, by graduation they eventually realize this course's benefits.

This course focuses on managing the IT enterprise in a modern organization, paying particular attention to effective communication. Students should learn and gain experience in consulting skills and written/oral communication for IT management topics, such as developing proposals, preparing technical papers, delivering technical and management presentations, conducting product and system evaluations, and providing IT consulting support to an organization. Topics also include effective and ethical methods of research and analysis.

Course Format and Content

The course spans seven weeks, meeting three-and-a-half hours per class session. In the first class session, students take an English final exam to gauge their grammar skills. Most students think they are "above" this type of exam, but usually only 25 percent score in the A range, 40 percent in the B range, and 35 percent in the C range. This exam (a freshman English exam) shows that almost everyone can stand to improve their writing. This approach helps convince students this course is valuable, and it helps dispel skepticism.

In the beginning of every class, we have some "ice breakers" that may include the "top ten common errors in English," "some typical difficulties in writing," "common speaking mistakes (for example, "irregardless" versus "regardless"), and other types of warm-up drills. Every class involves active learning: The students work in teams, give presentations, provide critiques of each other's work, and present their projects.

Also, every project and exercise has an IT focus. For example, one project was to have the students read a recent article about "knowledge sharing in virtual learning communities" that appeared in a leading IS conference proceedings. The students received a sample "journal reviewer's form" and they had to write a critique of the article, following the reviewer's form, to indicate whether the article merited acceptance "as is" in an IS journal, or deserved rejection or needed revisions. The students handed their critiques to their neighbors, and then the neighbors "critiqued the critique," and dialogue took place to explain their thinking and comments. Then, the professor asked how many would accept the paper as is, reject it, or ask the authors to revise it. When someone says to "accept the paper as is," that individual comes to the front of the class and role-plays as the author of the paper, defending the work and fielding questions from the audience.

The sidebars, "Project 1: Developing Functional Requirements," "Project 2: Moot Court Competition," "Project 3: Responding to Request for Proposals," "Exam,"

Project 3: Responding to a Request for Proposals

Johns Hopkins University is considering expanding its entrepreneurial spirit and is soliciting proposals from the Hopkins student community to develop a master's degree program in some innovative, multidisciplinary field that will cut across several of the Hopkins Schools. The field must have a technology component. The proposal should consist of the following:

➤ title and proposer;
➤ executive summary;
➤ proposed degree and field;
➤ background (describing this field);
➤ demand/supply market analysis for this degree/field (including competitor analysis);
➤ expected student enrollment over the next five years for this new degree, and resources (such as faculty and labs) needed over the next five years for this new degree;
➤ listing of courses (plan on 10 graduate courses (30 credits) for this new degree) with course descriptions/titles;
➤ marketing plan;
➤ Cost/profit estimates over the next five years for this new degree;
➤ references and appendices.

Written proposals are due by 5:30 p.m. on 4 March, 2004, and must be delivered to the course instructor. You must work in teams of two. You are also required to give a 15-minute PowerPoint presentation on your proposal to the class on 4 March (A five-minute question and answer session will follow your presentation).

and "Persuasive Speech Exercises" illustrate other classroom activities that integrate communications and IT.
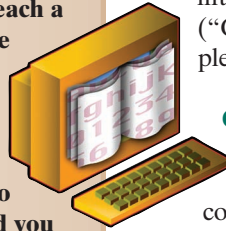
The course covers these topics:

- *Week 1:* Writing functional requirements; developing a software specifications document;
- *Week 2:* Writing a technical review; communicating through oral presentations; critical analysis; giving presentations on functional requirements (Project 1 sidebar);
- *Week 3:* Critiquing each other's technical review; information systems research methods (qualitative and quantitative);
- *Week 4:* Moot court presentations (Project 2 sidebar) on "Qualitative versus Quantitative IS Research Methods";

Exam

Assume that your CIO has asked you to teach a one-day workshop to her IS staff about how the CIO and IS staff can improve their presentation and writing skills as related to IT projects. Specifically, they are interested in knowing about the "best practices" for oral and written communications as related to their work. To prepare for this workshop, the CIO has asked you to write an essay that discusses this topic. Your essay will appear in the company newsletter, so be certain that the essay "practices what you preach"! Enjoy!

Persuasive Speech Exercise

Plan and present a three- to five-minute persuasive speech on a topic of personal interest relating to selling your favorite computer software product. You should consider the following:

➤ **What goal are you trying to achieve?**
➤ **What values, attitudes, and beliefs might you encounter in your audience?**
➤ **What attitudes and beliefs are you trying to alter?**
➤ **What action or non-action do you want your audience to take?**
➤ **What type of reasoning will you use?**
➤ **What other appeals might you use?**
➤ **How will you convince the audience you know what you are talking about?**
➤ **How will you begin and end your speech with strong arguments?**
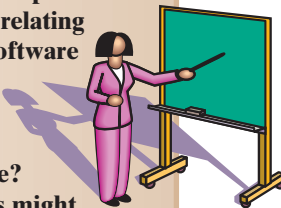
rules for applying COTS (commercial off-the-shelf) products; writing product/system evaluations;
• *Week 5:* IT management consulting skills; proposal writing; persuasive speaking; giving an "elevator speech";
• *Week 6:* Presentations on proposal (Project 3 sidebar); cross-cultural communications/business protocol; IT ethics;
• *Week 7:* Final Exam

Unfortunately, we have not found any textbooks that adequately focus on integrating oral and written communications with IT subjects for this course. We have used four books for the course: "Oral Presentations for Technical Communication," by L. Gurak; "The Complete Idiot's Guide to Technical Writing," by K. Van Laan and C. Julian;

"Managerial Consulting Skills: A Practical Guide, 2nd edition," by C. Margerison; and "Business Communications in Context," by M. Kramer. We are writing a separate book that integrates the communications skills with IT topics ("Communicating as IT Professionals," to be completed in September and published by Prentice Hall).

Course Evaluation

The "Technical Oral and Written Communications Skills for IT Professionals" course has run four times thus far as part of the Johns Hopkins MS-ITS program. The students completed evaluations that the IDEA Center at Kansas State University (http://www.idea.ksu.edu) compiled and analyzed. The evaluations showed that the strengths of the course were that it

• stimulated students to intellectual effort beyond that of most courses;
• inspired students to set and achieve goals, which really challenged them;
• gave projects, tests, or assignments that required original or creative thinking;
• asked students to share ideas and experiences with others whose backgrounds and viewpoints differ from their own; and
• asked students to help each other understand ideas or concepts.

The main areas for improvement involved lessening the workload in the course, especially over a relatively short seven-week period, and setting proper student expectations for the course.

As IT programs further evolve over the years, IT graduates will hopefully be well versed not only in their technical knowledge but also in the ways that they communicate their knowledge. Universities might use this newly designed course as a model in which to integrate communications skills into IT topics. We hope that this will stimulate ideas for others to follow and will further refine this integrated approach. ■

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