An Information System Course Model That Emphasizes Non-Technical Skills

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Abstract

"Change is like the weather: everyone talks about it but there is nothing one can do about it." (Herzog, 1991, p6) The only thing constant about Information Technology (IT) is change. Many of the technical skills that IT students learn become obsolete by graduation. This paper will discuss those skills that actually do remain constant, and will present two ways to encourage students to improve these skills in an information systems course. Information systems courses are often taught as lecture courses, with some hands-on exercises. Such courses generally precede a Systems Analysis and Design course, and may be taught at the sophomore level (Fundamentals of Information Systems), or at a junior level (Information Systems Theory and Practice or Management Information Systems). Specifically, in this paper we will stress the use of debates and open-ended hands-on projects as a means of emphasizing these unchanging skills.

Keywords: non-technical skills, communication, MIS, debates, hands-on projects, teaching tips for IT courses

INTRODUCTION

Graduates from Information Systems (IS) programs should possess many non-technical skills combined with Information Technology (IT) skills. Professional integrity, ethical decision making, problem finding and solving, communication skills, project management and negotiation skills represent a few of these necessary skills. We will look at ways to specifically emphasize problem-solving and communication skills through the use of debates and open-ended problems.

Graduates often find themselves using different tools that those they used in classes. In fact, tools used in the first or second year of a degree program may be obsolete before graduation. Providing students with skills that will be relevant in most real-world scenarios is more useful than teaching a specific tool in depth. One important skill that an IT graduate must acquire is the ability to learn new tools. Open-ended problems can help students with this skill.

Communication skills and analytical skills may be developed using techniques such as debates.

NON-TECHNICAL SKILLS REQUIRED

In a recent national survey reported in The Nanosecond, Spring, 2001, non-technical skills such as thinking skills, teamwork, desire to learn, attitude, and communication skills topped the rankings as necessary and important skills for graduates of IT or IS programs. See FIGURE 1.

In 1987, a questionnaire asked IT professionals to rank a series of technical and non-technical skills. (Pollack, Shepherd, 1987, p. 64) Written communication was ranked highest of all technical and non-technical skills followed immediately by programming and oral communication. Additional studies (McGinnis, 1995; ITAA, 2001) similarly emphasize the need for non-technical skills. The AITP/ACM/AIS model curriculum guide for programs in Information Systems, published in 1997, contains non-technical skills as part of necessary portions of the curricula for several courses such as Fundamentals of IS. (IS'97, Model Curriculum Guidelines, 1997)

FIGURE 1. Top Ten Technical and Non-Technical Skills For Graduates of an IS or IT program

Content/Skill	Ranking
Thinking Skills	1
Teamwork	2
Desire to Learn	3
Personal Characteristics	4
Personal Attitude/Motivation	5
Communication Skills	6
Systems Analysis, Design…	7
Basic Foundation/Analytical Skills	8
Programming Skills	9
Computer Software Skills	10

The ITAA (Information Technology Association of America) recently reported that:

> More than one-third of the skills identified by managers as important are non-technical skills such as good communication, problem-solving, and analytical skills, along with flexibility, and the ability to learn quickly. (ITAA, 2001)

A four-year degree program in IT should emphasize the non-technical skills throughout the curriculum. Students need to develop these skills as they progress through the program so that more can be expected of them in upper-division courses. It is particularly important to emphasize these skills in an IS course, which often serves as a prerequisite to upper level courses. Also, students should experience specific IT applications of these non-technical skills, rather than experiencing them only as part of their liberal arts coursework.

DEBATES

Debates may be used effectively to emphasize oral communication, persuasion or selling techniques, research and critical analysis of facts and opinions, and big pictures perspectives. Although informal debating may be beneficial, formal debates with structured speeches and time limits work best. A modified cross-ex format with teams of two debaters works well. Individuals not debating serve as timers or judges (requiring students to rank the credibility of evidence, and note effective/ineffective communication techniques). Timing is critical and timers must tell debaters to stop when they use all of their time.

Ethical issues in IT are often good subjects for debates because they include real-life issues that managers encounter, and they encourage students to reconsider their current perspectives, hopefully broadening their understanding. Since IT issues arise in the news often, current events may work well as debate topics.

Other students asking difficult questions during cross-examinations threatens some students, accustomed to presenting cases without criticism. Also, some students feel strongly about particular issues. They occasionally become emotional during debates. Addressing this possibility before the debates begin usually creates a "game" atmosphere that keeps people from having hurt feelings. In fact, a list of rules can be established, including a "No crying" rule. Cross-examination is an important element of the debate. The cross examination of the opposing team requires students to carefully document sources of evidence, and to prove their case. They must know their arguments and position, rather than simply reading a speech. One team wins the debate based on the judges' and instructor's decisions, and one debater earns a best debater award, which will be reflected in the debate grade. Judges are graded on the quality of their judging sheets. Judges' comments are evaluated and generally returned to the debaters, but always anonymously.

Debate grades are based on the logical proving of the case or arguments, on the quality of evidence and points presented, on listening skills shown through responses to valid points presented by the opposition, and on verbal and non-verbal speaking skills (including the use of fillers like "um" and hand gestures). Quality of evidence is judged by traditional tests of facts. See FIGURE 2 for sample debate topics.

FIGURE 2
Example Topics for Debates

Spam messages should/should not be assessed a minimal processing fee.

Employees should/should not be allowed to access the Internet for personal reasons on their employer-supplied computer systems.

Napster should/should not be required to limit music swapping on their web sites.

Microsoft has/has not exercised monopolistic power over competitors.

Although debates are time consuming, the time is well spent when the emphasis is developing and honing non-technical skills. A further advantage of using debates in an information systems course is that many students find them interesting and fun. FIGURE 3 gives a sample debate for-

mat for a typical debate in an information systems course with a fifty to sixty minute class period scheduled.

FIGURE 3
Typical Debate Format
One Hour Class

First Pro speaks	6 minutes
Cross exam by 2nd Con	3 minutes
First Con speaks	6 minutes
Cross exam by 1st Pro	3 minutes
Second Pro speaks	6 minutes
Cross exam by 1st Con	3 minutes
Second Con speaks	6 minutes
Cross exam by 2nd Pro	3 minutes
Rebuttal by Con Team	3 or 4 minutes
Rebuttal by Pro Team	3 or 4 minutes

OPEN-ENDED PROBLEMS

The purpose of an open-ended project is to require students to problem solve, in addition to using other non-technical skills such as writing or learning new tools. Such projects may be done in teams or individually. Open-ended projects do not provide complete step-by-step instructions. No "right" answer exists, although there may be "wrong" or poorly conceived solutions. Technical skills are often a part of the project. One example of an open-ended project is the creation of a decision support system (DSS). Although some programming or application development is required, perhaps using a spreadsheet program like Excel, much of a DSS involves interacting with a decision maker. The decision may involve something fun, such as where the decision maker would go on a trip based on criteria of his/her choice. Or, the decision might be tied to a specific sort of business application such as how many books of a particular title a publisher should publish. Regardless of the decision being addressed, DSS often involve open-ended sorts of problems.

Another open-ended project could involve exploration of software tools, such as those used in systems analysis. In the following example, we were fortunate to have an ideal situation for an open-ended project in our CIS Lab. We had obtained a grant for COOL CASE tools, but not much documentation to accompany them. Most of the students in this information systems course had never used any CASE tools, and did not know what the various tools involved. The following project was assigned in an information systems course, in this case at the junior level.

Case Tool Project:

> *Twenty-five of the points for the project apply to a written report. The report should compare and contrast three tools used for systems analysis and design. The tools should be general (like HIPO charts) rather than specific packages (such as COOL). One tool that must be included is the dataflow diagram. The report should be concise (certainly no longer than 8 pages with attachments), but explain clearly what the tools are, show samples of symbols involved, give examples of when tools might be used, and describe the differences and similarities between the three tools. The remaining points for this project apply to the correct creation of a dataflow diagram using the CASE tool in the CIS Lab. The dataflow diagram should diagram the flow of data in a car rental agency from beginning to end, beginning with when a customer initiates the rental of a car.*

From an educator's perspective, this project served the students well in emphasizing non-technical skills. Several of the students who had consistently performed well on exams complained about the vagueness of the directions. They craved a more detailed explanation. They wanted to know more about the software they would be using, for example, before beginning. Instructions were purposefully vague and open-ended to require students to play with the software to figure out how to accomplish their goals. Afterwards, the same students praised the project, describing how much they had learned from it.

CONCLUSIONS

Although the IT profession is certain to change, non-technical skills repeatedly appear in the results of surveys asking professionals what they consider to be the most important IT skills. It can be concluded that these non-technical skills are required of IT graduates. An information systems course is one class in the curriculum where these skills must be developed and emphasized. These non-technical skills are improved by practice. Using debates and open-ended problems in an information systems course helps students obtain and develop those important skills that will not become obsolete.

A fitting end to this discussion comes from the article quoted at the beginning of this paper:

> During the whole process of implementing change, the most powerful tool is an open mind *and* a sincere wish to understand the other person's point of view. (Herzog, 1991)

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