

The Disconnect of the Non-Computer Information Systems Major to the Information Systems Literacy Course

Dr. Jeanne Baugh
baugh@rmu.edu
Computer and Information Systems Department
Robert Morris University
Pittsburgh, PA

Abstract

How does one teach introductory Information Systems concepts along with application software to students with a variety of backgrounds? Information Systems literacy courses such as this exist in many University core curriculums. What can be done to help the students see the value of this course as it applies to their major, no matter what it may be? This paper provides the results of surveys done with non-Computer Information Systems majors who were taking a required University core course in Information Systems. Results highlight the disconnect felt by the students towards the Information System topics and their major area of study. Student attitudes toward the course are discussed, along with recommendations for course structure and content. In an effort to bridge the gap the students feel between the Information Systems topics and their major, a specific approach to teaching the course is presented with the Information Systems topics linked to their major. Having a strong background with computers will make the student more marketable to the perspective employer.

Keywords: Computer literacy, Information Systems Coursework, Student interest

1. INTRODUCTION

How do you teach a literacy course in Information Systems to students from a variety of backgrounds? (Easton 2003) That could be restated. How do you teach it and keep the interest of your students? Many Institutions of higher education teach such a course under the heading of computer literacy. (SIGCSE 2002) "The term "computer literacy" means different things to different people. The ambiguousness of this important term has resulted in confusion as to "how to provide students with true computer literacy at the university level." (Masson, McMorro 2006) The IS2002 model curriculum has

tried to address what should be taught in such a course. (IS2002, Model Curriculum). Courses in this area have evolved over time with changing technologies. (Hoffman, Blake 2003) Students currently entering college are much more experienced with computers than those who entered just a few years ago. (Marquis 2002) So what kind of a course should students be required to take? Students should not only know how to use computer application software, but should also understand how computers work and how to manipulate them. (Goldweber 1994). Some literacy courses cover just the concepts, some cover just applications, while others try to do both. It

is very difficult to do it "all". But does it "all" really need to be done? A greater challenge is to "design IS courses for students who have no intention of pursuing the vigorous IS professional training". (Law 2003) It is clear that in the area of computer technology, all students graduating from College must be technologically literate. But the traditional approach of covering the office applications might not provide the student with what they need. (Hoffman, Blake 2003)

What do the non-CIS (Computer and Information Systems) majors need to know? (Lynam 2003) Students must be competent with technology. Competency can be defined as "The ability to perform in the workplace." (Goldsworthy 1993) But the debate over what should be taught has been going on for years and probably will continue for many years to come. This paper does not address that particular debate. It does however focus on attitudes of non-CIS students taking core computer literacy courses and the apparent disconnect they feel between these topics and their various majors.

Approximately 5,000 undergraduate students are enrolled at a private University in Pittsburgh Pennsylvania and all are required to take a computer literacy course taught by the Computer and Information Systems Department. Technologies, such as web-based applications, are being increasingly used by organizations to support their work. Therefore, students will need these skills to compete in the job market. (Seyed-Abbassi 2002) "All individuals in our society must acquire basic computer literacy to function successfully." (Orr 2002) Previous analysis states that the literacy skills of the students span three areas, entertainment, communication, and construction. Furthermore, "each is important to consider, in that high levels of use across categories indicate a broad base of technology skills". (Ching, Basham, Jang, 2005) There are several versions of the core computer literacy course offered at the University, including one offered to nursing majors and the one offered to business majors. The basic material covered is the same in all versions, but business and health care are emphasized in some sections of the course. (Hart 2000)

Allowing flexibility with this course is seen in a very positive light among other departments on Campus. (Learmonth 2001) All students, other than business and nursing majors enroll in a general course as described here:

"Information Systems Applications provides the student with an integrated perspective of technology and Information Systems used to support the operation of an organization. The course involves both an overview of technological concepts and practice using application software to enhance decision-making. Concepts addressed include: computer hardware and software, telecommunications and networks, the Internet and intranets, data management, and decision support systems. The student learns to support decision-making necessary to the modern workplace by completing a series of individual and group projects. The projects include case studies requiring the use of spreadsheet and database management software."

As seen by the course description, both concepts and applications are to be covered. This can be an overwhelming task for one course. And, there is no shortage of text books on the market in the area of information system literacy. Many are generous in the amount of topics covered. Does a non-CIS major really need to master all of the information in such books? There are various theories as to how a course such as this should be taught. (Learmonth 2001) This paper does not address what must be taught. But rather, it focuses on the attitudes of the students enrolled in the core computer literacy course and suggests a method for presenting the material to the student while emphasizing the relevance of the material to his major. "Students learn about technology if they can relate it to their lives". (Hoffman, Blake, 2003)

2. SURVEY RESULT

All students taking the core Information Systems literacy course were given a questionnaire to complete during the last week of the semester. There were

approximately 425 students taking the various versions of the course and 350 returned the survey. Among the students enrolled, approximately 25 students were in each of the Nursing and the Business versions of the course. It must be noted that there was very little or no differences in the percentages when looking at the each version of the course. One would think that those students taking the business or the nursing version would answer the questions differently and see more of a relevance of the course work to their major, but that was not the case. Also, separating the data according to the student's year in school led to no significant differences. Therefore, the separation of the data by versions of the course and year in school was not necessary for this paper. Results of the major survey questions are listed in Appendix 1.

The results of the survey were not surprising to those of us who teach this Literacy course. As can be seen, 88% of the students were taking the course because it was required. The topics presented are of importance to anyone using Information Systems. Of the respondents, 36% were not interested in the course and only 50% were somewhat interested. Additionally, 19% saw no relevance and 60% saw limited relevance to their major. It is interesting to note that when looking only at the seniors, the percentages stayed the same. One would think that as a senior, a student would be more able to see the relevance of the subject matter to his major. This is a very disturbing result because this is an important area of the student's core. Computers and Information Systems are in every area of the public and the private sector and it is unfortunate that these students did not recognize the importance of this course. (Gallivan, Truex, Kvasny, 2004) Many employers in many areas of the job sector are looking for an employee who has a knowledge of computers and Information Systems. The hiring employer looks favorably upon the applicant who embraces technology and is able to apply technological enhancements towards their enterprise. The National Association of Colleges and Employers reported that employers are looking for employees with

computer skills even in non-related positions. (<http://www.nacweb.org>) Therefore, this course could help to make the student more marketable in his job search.

As was discussed in the previous section, this course seeks to provide the student with a great deal of information. According to the results of question seven, 58% of the students liked the hands on computer work and only 12% liked the IS topics. Questions five and six show that there was some interest in Access and Excel. Spreadsheets and Databases are everywhere and it is extremely likely that the student will encounter them, no matter what his chosen profession. "This knowledge of creating, manipulating and analyzing data for decision making purposes is fundamental for those managers making business decisions." (Dunn, 2005) How can the students become more interested in the course work? Perhaps there is too much information to be covered? Students often report they are very proficient with computers and technology. But, research has shown that this may not always be the case. (Waterhouse, 2005) Many students reported that they memorized information system terms for the tests. But they felt that they would never need the knowledge in the future because that was not their major. What they are failing to recognize is that they may encounter these topics in the future, no matter what their area of employment.

In question three, 64% said that they did not have any assignments and/or reading that dealt specifically with their major or area of study. This could be a reason why they did not see the relevance of the course to their major. But if structured correctly, all assignments could relate to all majors. The students were just not presented the material in a context where they could apply the IS subject matter to their individual major.

Questions ten and eleven indicate that students felt they were spending a considerable amount of time on the course, but still felt that the topics were not relevant. Only 15% of the students felt that the course was not challenging.

Studies have shown that "students view their computer competence differently depending on whether they are using the technology for personal or course-related tasks. Additionally, while the expressed levels of experience and comfort are high for some forms of technology, exposure and confidence with more advanced applications are lacking" (Messineo, DeOllos, 2005) Therefore, being challenged in this course is quite understandable. Time spent on the course that is meaningful to the student will give the student a greater appreciation for the topics covered. (Hoffman, Blake, 2003) As far as the book is concerned, 57% of the students felt that it was just right for the course. This is an interesting result, because one complaint most often heard from faculty who teach the course is that the book covers too much. Finally, only 46% of the students would recommend the course to others. This finding should definitely be addressed in the curriculum planning for the course. Students liking a course or at least finding it interesting and challenging may mean that they will promote it to their peers. If they were to understand the connection Information Systems has to all areas of study, many more students would sign up for the course even if it was not required. The non-CIS major definitely sees a disconnect between the relevance of the IS topics and his individual major. What can be done to help these students see the significance of the material?

3. POSSIBLE COURSE STRUCTURE

In looking at the results of this survey, perhaps another method for teaching the course could be explored. Having taught various literacy courses many times in the past, the author has been looking at alternate delivery methods where the students would be more interested in the topics. Perhaps even some excitement could be generated towards the area of Information Systems? Since many of these students are undecided as to their major, this might also lead to their transfer to the degree in Information Systems. According to Tsai, "it is the responsibility of the education institution to offer a computer literacy class or series of classes for preparing its students with proper

computer knowledge in a suitable learning environment before they enter the business world". (Tsai 2002) Teaching a computer literacy course to non-majors can be a mundane task. Almost all Institutions of Higher Education have such a course. So how can it be made more exciting to both the students and the instructor? The fact that students all come from different backgrounds and majors could be seen as an advantage. Applications of the technology to these various areas could be the focus of the course.

Using a small group of 15 students, the author tried an approach where all Information Systems topics were introduced to the student with his major or area of interest in mind. The student was asked to pick an organization to model throughout the entire semester. The choice of the organization related to the student's major or some other area of which he was interested. The organization was used by the student as the framework for all assignments during the semester.

This course was to teach concepts as well as the application software, Microsoft Excel and Access. The approach taken for instruction in the classroom varied according to the topic being covered. In the case of Excel and Access, skills were taught before the assignments were given. As to the information system concepts, there would first be a discussion in class of the particular topic. Next, the student researched the topic as it related to his organization. The student then reported his findings to the rest of the class. These oral reports were both formal with the use of Power Point, and informal in nature

Some examples of the organizations chosen by the students are listed below:

- KDKA Pittsburgh Television Station
– Student was a media arts major and had an internship with the station
- Restaurant – Student was a business major and had a job at the restaurant
- Hardware Store – Student was a business major and his parents owned the Store
- Insurance Firm – Student was a business major

- Elementary School – Student was a education major
- Law Firm – Student was a pre-law major
- Brokerage Firm – Student was an Economics major
- Hospital – Student was a Health Care Information Systems major

Some of the semester project assignments were as follows:

Initial Profile Project Assignment

You are to choose some business or organization that you wish to model for the semester. This may be a fictitious business or organization or it may be a real one in which you may or may not be involved. Any financial data you will provide during the semester will be simulated. You will not be asked to provide any sensitive information. The business/organization must meet the following requirements:

- It has employees
- It offers a service or produces a product
- It has a variety of financial needs

You are to create a profile of your business/organization. The following elements of the business/organization must be addressed in your profile:

- Name and location
- Purpose
- Mission statement
- Number of employees
- Location of employees (business may have more than one site)
- Summary of various financial needs

Please create a professional summary of the above information with a cover page stating your name and the position you hold in the business/organization. (this may be any position you choose for yourself)

Spreadsheet Examples Assignment

You are to create five spreadsheets that are related to tasks that might need to be completed for your organization. One of the spreadsheets is to be a payroll register. The other four spreadsheets are to be of your choice. All of the spreadsheets are to be done in a professional manner

(margins, headings etc...) At least one of the spreadsheets is to have a chart (graph) using some of the data. You are to list each spreadsheet and give a short explanation of what is contained on the spreadsheet and how it could be used in your organization to help with decision making.

Hardware Selection Assignment

You are to make some hardware selections for your organization. You must decide what type of network you will install, as well as what kind of computers you will be purchasing. In this project, you may choose to use just one department or one location of your organization. You must indicate what type of network configuration you will be installing as well as which network software you will use. You must provide support as to why you have made your selections. The following list is the minimal specifications you must provide:

- network layout
- network type
- network software
- Peripheral devices to be shared

You must also select the computers you will purchase for all individuals who will be connected to your network. Again, you must provide exact specifications of the selected computers as well as why you have chosen them. The following list is the minimal specifications you must provide:

- Computer type
- Processor type and speed
- Drive size
- Memory size
- DVD/CD-ROM specifications
- Monitor type and size
- Windows version

Please write this in a format proposal to the President/CEO of your organization. You are to have a cover page in the form of a memo that summarizes what will be contained in the pages that follow. Complete this assignment as though you were actually providing this information for upper management.

Software Selection Assignment

In this phase of the semester project, you are to investigate software appropriate to your organization. You are to make

recommendations as to what software package should be purchased to support the major function or functions of your organization. In making the recommendation, you must compare at least two software packages in terms of features, hardware requirements, price, limitations, etc... Based upon your findings, you will make a recommendation to your boss/supervisor as to what should be purchased. You must provide all supporting documentation as to why you have made your choice. You are also to outline a plan for implementation of the software, including installation, training, and data transfer.

You will make a formal presentation to your boss (the class) summarizing your recommendation. This presentation is to be done using Power Point and should include all pertinent information in support of your recommendation. Your presentation is to be no more than 3 to 4 minutes long.

Virus Protection Assignment

1. You are to search for five different viruses that are "out there". List the name of the virus and exactly what it does to harm your computer.
2. You are also to find a virus protection program to protect your computer from the above viruses and others that may exist.

Summarize your findings:

Write a memo to the head of your organization recommending the purchase of the virus protection program you found in step #2 above. In this memo you are to make a case for why you have chosen that particular software package. Among the reasons why you have chosen it will be the five examples of viruses you found in step #1 above.

Intranet Assignment

You are to use the web site provided in class and set up an intranet location for your business/organization. At this web site, you will do the following:

- Make yourself an administrator on the intranet site
- Add 5 additional users to your site

- Set up a discussion forum on a topic related to the business of your organization
- Upload a document to your site
- Add a poll to your site
- Add a calendar to your site and place a few activities on it (make the calendar public)
- Add three group links to web sites of interest to your organization
- Add three tasks that are to be completed

Write a one page paper summarizing the value of an intranet to your organization. In the paper, indicate the address of the sample intranet site you have set up while doing the above assignment.

Database Assignment Part I

You are to create a database to store employee information at your organization. You will define the necessary tables, forms, queries and reports needed for access to all related employee information. Once you have created the tables, you are to create a form for each table. You are to make the forms look neat and user friendly with each form having the same color scheme.

Each form is to have at least the following:

- A title (in the header area)
- A close button (in the footer area)
- An add record button (in the footer area)
- A delete button (in the footer area)

Database Assignment Part II

In this part of the assignment, you will improve upon the look of the database by doing the following:

- Create an opening form containing a logo for your company/organization
- Make the schedule form, the payroll form, and the evaluation form a sub form of the Employee form (this will be demonstrated in class)
- Using your forms, enter records into the payroll, schedule, and evaluation form
- On the Main form place buttons to go to all of your other forms.

Database Assignment Part III

In this part of the database project you are to do the following:

- Insert the employee pictures into the database
- Create the following reports from queries:
 1. List all employee social security numbers, first and last name
 2. Make mailing labels for the employees
 3. List the employee name and their schedule information
 4. List the employee name and their evaluation information
 5. List the employee name and their payroll information
 6. List all employees who had a specific evaluation (prompt for the evaluation)
- Create a report form with buttons on it that will run each of the above reports.
- Create a button on the main form that links to the report form

- Each project is to be in a separate section

4. CONCLUSIONS

It is clear by the survey described in this paper, that students do not see the connection of the IS topics covered in their Information Systems literacy course to their areas of study. The needs of an Information Systems literacy course are many, as listed in the IS2002 Model Curriculum. Using the teaching method described in this paper, the student will learn many of the required topics in a context that is meaningful to him. This approach can be used for any level of students, from the beginning freshman to the graduating senior. The freshman will be introduced to topics he may use throughout the remainder of his academic career and beyond. The senior will take away from the course an overview of IS topics that may be applied to his upcoming employment. The portfolio of semester projects also demonstrates to prospective employers that the student has a general knowledge of IS topics that are related to his field. This is something that is very desirable in the job search.

Digital Camera Assignment

You are to compare and contrast 3 different digital cameras to be purchased for your organization. Write a memo recommending a camera for purchase. Attach the researched camera information. In this memo, you are also to indicate for what the camera will be used.

Final Project Assignment

You are to gather all of your projects this semester and place them in a folder. You are to organize them in this manner:

- Cover page (your name, name of your organization, date)
- Summary page - On this document, you are to summarize what is contained in the folder. Write a summary paragraph and then list the name of each project and a short description of what was done.

An Information Systems literacy course is a tough one to teach, especially to students from a variety of backgrounds. This approach generated an amazing amount of student interest and many positive comments were received. Each student was very proud of his portfolio of semester projects. The approach for this course allowed the student to "learn better through a particular domain of their interest" and "see the practical value of what they learned" (Robbert 2000). The students were happy not to be memorizing lots of computer terms, but mostly they were happy to apply the technology to what interested them. They became technologically literate while working in areas that they choose.

Their reports to the class during the semester actually helped in the teaching and learning process. For example, when doing the network assignment, each student chose a slightly different configuration of hardware and software. Each explained his choices to the class

which made this networking topic much more interesting to everyone, including the instructor.

One of the drawbacks to this approach is that it limits the topics that can be covered. There just was not enough time to cover all of the concepts and the application software. But this often is a problem even if the course is not taught in this manner. And at times, helping the student with his various projects was challenging because everyone was doing something slightly different.

Overall, this approach worked quite well. The students who actually had a personal relationship with an organization (where they were employed etc...) seemed to be a little more interested in the work during the semester. Therefore, if one is to use this approach, it is a recommendation that students be urged to find a real organization. The high student involvement that was experienced made the course delightful to teach. The students were excited about the technological topics, because they had an interest in where the technology would be applied. They could become technologically literate while working in areas that they choose.

It is true that the course was taught in the manner described here to only 15 students. And, the feelings of the students are from the view of this author and there is no statistical data to back up these feelings. Therefore, the author plans to teach the course in this manner to a larger number of students in the future. This course structure is presented here as a possible solution to the apparent non-relevance the students feel (according to the survey results). But, it is clear by the findings here that there is always room to improve what is being done in classroom. Having non-CIS majors more interested and involved with the course work in an Information Systems literacy course is a worthy goal. Also, since the nation wide enrollment in the Information Systems programs has declined, this course could be used as an advertisement for the major. Perhaps students would be inclined to transfer to this major if they were excited and interested in the coursework.

Another area that was not addressed in this paper is the fact that just about all of these sections of the literacy course were taught by adjunct instructors. The quality of the course content must be ensured if this happens to be the case. There seems to be a trend in Information Systems that the full time faculty should teach these introductory courses, because of the importance of a foundation course such as this one. The effect of adjuncts on an introductory literacy course is something that should be studied in the future.

The disconnect of the IS topics and the non-IS student should be addressed in order to provide the student with a quality technological education that they will take with them and apply to their chosen profession. Creative teaching methods for the Information Systems literacy course can help to eliminate this disconnect.

5. REFERENCES

- Ching, Cynthia; Basham, James; Jang, Eunice, 2005, "The Legacy of the Digital Divide" Urban Education v40 n4 p394-411 Jul 2005
- Dunn, Deborah, 2003, "Database Systems and Oracle: Experiences and Lessons Learned", Association of Small Computer Users in Education (ASCUE) 38th, Myrtle Beach, SC, June
- Easton, George, 2003, "Assessing Computer Literacy: A Comparison of Self-Assessment and Actual Skills", Current Issues in IT Education. p.238-254. 2003, IRM Press
- Goldweber, Michael; Barr, John; Leska, Chuck, 1994, "A New Perspective on Teaching Computer Literacy", Technical Symposium on Computer Science Education Selected papers of the twenty-fifth annual SIGCSE symposium on Computer science 1993
- Goldsworthy, A.W., 1993, "IT and the Competency Debate- Skills vs. Knowledge a Major Issue", The Australian Computer Journal, 25(3):p. 113-122 education, Phoenix, Arkansas

- Hart, Jan K., 2000, "The Role of Computers and Technology in Health Care Education", Case Studies on Information Technology in Higher Education: Implications for Policy and Practice. p.195-207
- <http://www.naceweb.org/> - National Association of Colleges and Employers
- Hoffman, Mark; Blake, Jonathan, 2003, "Computer literacy: today and tomorrow", The Journal of Computing in Small Colleges Volume 18, Issue 5 Pages: 221 - 233
- IS2002, Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems, 2002, curriculum effort of Association for Computing Machinery (ACM), Association for Information Systems (AIS), Association of Information Technology Professionals (AITP)
- Law, Wai K. , 2003, "Challenges for Curriculum Design in IT Education", Information Technology & Organizations: Trends, Issues, Challenges & Solutions. p.1103-1104.
- Learmonth, Rod, 2001, "Flexible Delivery of Information Systems as a Core MBA Subject" Annual Joint Conference Integrating Technology into Computer Science Education, Proceedings of the 6th annual conference on Innovation and Technology in computer science education, Canterbury, United Kingdom
- Lynam, Linda, 2003, "Required Software Proficiency in General Education and Business Courses", Current Issues in IT Education. p.223-227, IRM Press
- Marquis, Gerald P., 2002, "What is the Fate of the Computer Literacy Course?" ISECON, 19th Annual Conference on Information Systems Education, San Antonio, TX
- Mason, John; McMorrow, Robert, 2006, "YACLD: yet another computer literacy definition", Journal of Computing Sciences in Colleges Volume 21 , Issue 5 (May 2006) Pages: 94-100
- Messineo, Melinda; DeOllos, Ione Y., 2005, "Are We Assuming Too Much? Exploring Students' Perceptions of Their **Computer** Competence", College Teaching v53 n2 p50 Spr 2005
- Orr, Claudia, 2002, "The Effect of Individual Differences on Computer Attitudes , Advanced Topics in End User Computing", p.210-232. 2002. Edited By: Mahmood, M. A., Idea Group Publishing
- Robbert, Mary Ann; Wang, Ming; Guimaraes, Mario; Myers, Martha, 2000, "The Database Course: What Must Be Taught," SIGCSE Bulletin Proceedings of 31st SIGCSE Technical Symposium on Computer Science Education, March, pp. 403-404.
- Seyed-Abbassi Behrooz, 2002 "The Evolution of an Advanced Database Course in an Information Systems Curriculum" ISECON 2002 19th Annual Conference on Information Systems Education
- SIGCSE 2002, CS Body of Knowledge- Information Management Computing Curricula 2001
Technical Symposium on Computer Science Education, 2002 , Proceedings of the 33rd SIGCSE technical symposium on Computer Science education, Cincinnati, Kentucky
- Tsai, Nancy, 2002, "Measurement of a College Computer Literacy Course", Information Technology Education in the New Millennium. p.49-53.
- Waterhouse, Janette, "Technology Training Can Be a Piece of Cake", Computers in Libraries v25 n8 p16-24 Sep 2005
- Gallivan, Michael; Truex, Duane; Kyasny, Lynette, 2004, "Changing patterns in IT skill sets 1988-2003: a content analysis of classified advertising", ACM SIGMIS Database, Volume 35 Issue 3

Appendix 1. Survey Results:

Questions:	Response	Response	Response	Response
1. Which of the following best describes why you are taking this course	Required course 88%	Interested in Information Systems topics 5%	Needed additional credits 4%	None of the above 4%
2. How interested in this course were you?	Not very interested 36%	Somewhat interested 50%	Very interested 14%	
3. Did you have any assignments and/or reading that dealt specifically with your major or area of study?	Yes 36%	No 64%		
4. How relevant do you feel this course was to your major or area of study?	Not relevant 19%	Somewhat relevant 60%	Very relevant 21%	
5. What best describes how you feel about the Excel projects?	Was not very interested in completing them 18%	Was somewhat interested in completing them 46%	Was very interested in completing them 17%	No opinion 19%
6. What best describes how you feel about the Access projects?	Was not very interested in completing them 38%	Was somewhat interested in completing them 32%	Was very interested in completing them 11%	No opinion 19%
7. Which area of the course did you like best?	Hands on computer assignments 58%	Information System topic discussions 12%	No area liked best 30%	
8. How challenging have you found this course to be?	Not challenging 15%	Somewhat challenging 70%	Very challenging 15%	
9. What best describes how do you feel about the Information Systems course book?	Book was just right for this course 57%	Book covered too much for this course 11%	Book did not cover enough for this course 8%	No opinion about the book 24%
10. How much time did you spend on this course this semester?	Minimal amount of time 23%	Average amount of time 67%	Much more time than expected 10%	
11. Compared to other courses you took this semester, how much time did you spend on this course?	Less than others 35%	About the same as others 57%	Considerably more than others 8%	