

# The Computer Literacy Course: Putting It All Together

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## Abstract

The Computer Literacy course has specialized in the teaching of computer technology skills. The instructor has well developed tools for teaching the minutiae of application usage but most texts, and so most courses, lack resources that develop critical thinking and problem solving skills. The paper describes one attempt to teach computer literacy within the context of a single 'real-world' scenario. The approach emphasizes teamwork, planning, rational problem solving and the management of complex and ambiguous requirements. A Year in the Life Of... details the daily incidents in the life of a company for one full year. Each day some new problem or event takes place. Students must learn to deal with an ever-changing work environment.

**Keywords:** critical thinking, real-world problems, team work, planning documents, direct or vague instructions, organization of raw material

## 1. INTRODUCTION

In the business world of today competition is all important and employees that know how to think on their feet, organize with minimal input from management and plan and solve new problems are the employees that will be successful. Our role as educators is to provide a platform for that success. Group projects are one way of preparing students to be independent thinkers and doers. "Thinking is distributed among the members of the group. All members of the group work on the same aspect of the problem at the same time, sharing cognitive responsibility for the task at hand" (Palincsar, 2002). In the computer literacy course, that means teaching our students:

- a. How to plan a document, worksheet, database, or PowerPoint presentation.

- b. How to work with other people on a project.
- c. How to divide up a project into smaller tasks and delegate certain tasks to individuals.
- d. How to "get started" working on a large project.
- e. How to organize large volumes of material into a finished project.
- f. How to take direct or even vague directions and produce a meaningful and organized result.

Companies are looking for employees with significant technology skills, not just basic literacy (which has a relatively short shelf life anyway) but the ability to select appropriate technologies and apply them to real problems. This is where we have an opportunity to improve our teaching. Let's not teach students just the applications, let's teach them how to apply them in the real world. We are fond of teaching finite skills

because they are easy to document and to measure. Real life isn't finite, minute or easy to grade. Nick Adams, Professor of Educational Psychology at the University of Missouri – Columbia, was fond of saying "difficult situations" could be defined as "those situations where there was a high degree of complexity or a high degree of ambiguity." In the modern business environment, both are common. Critical thinking definitions abound in all the books, but real-life applications that require a student to use critical thinking techniques are missing. This particular simulation requires students to plan documents, worksheets, databases and PowerPoint presentations without the crutch of "click on cell B16 and type in ... ." The student must actually decide what must go into each cell without specific instructions.

Teamwork is very important in corporate America today judging by most questions asked by interviewers such as "Do you work well as a member of a team?" Since most students are use to doing an entire project from start to finish without input from other people, they have never learned the skill of delegation which is critical to the successful completion of a large project. The ability to analyze large volumes of information can be a daunting process under the best of circumstances, but with no prior experience, it can be overwhelming. Since management is usually "result oriented" it is expected that detailed information on how to accomplish a specific task will not be forthcoming and most employees are expected to accomplish the results specified by management with little or no instructions.

## 2. PERSPECTIVE

Cooperative learning has been effective in the past as noted by Johnson, Johnson, and Holubec (1994) that defines cooperative learning as, "The instructional use of small groups so that students work together to maximize their own and each other's learning." Cooperative learning or teamwork promotes benefits that cannot be found in traditional courses. Johnson, Johnson, & Smith, 1991, stated that teamwork promotes higher achievement, and better interpersonal relationships rather than individual efforts. Developing responsibility in that each member of the team needs to cooperate and get their portion finished on time are

necessary ingredients of successful teams. The teams are comprised of four to five people, four being the optimal number. Students have input into the makeup of their team, but most of the time the teams are picked randomly simply because most of the students do not know one another. Each member of the team is responsible for all aspects of the project in that one person may work with Word this week and Excel next week. The team members keep a record of what each team member contributes and this is turned in at the end of the course along with their grades of each other. Roles of team members are decided within each team. A Team Leader is usually elected to keep everything together. The entire team acts as the Chief Financial Officer of this particular company although this could be expanded in future revisions so that each team member has a different function.

## 3. A YEAR IN THE LIFE OF .....

We need to connect the basic skills to the real world. At first glance the following excerpt may seem like a case study, but most case studies are too often ignored and they often don't have any 'meat' to them in terms of what students are expected to do and are generally unconnected across different chapters of the text. Case studies do not challenge the imagination or intellect. A more viable approach is to provide a single overarching context in which all the skills are taught. The following excerpt is the introduction to the simulation.

"NASAS is an aerospace company that has been in business for about 55 years. They are instrumental in designing living accommodations for space exploration. In addition, they have military contracts for such projects as new defense systems. The company has a total of 100 employees, consisting mostly of professional people such as engineers. The company is very profitable and has grown tremendously over the last 7 years.

Today is December 31, 2015. Tomorrow on January 1, 2016 not only does a new year start but a new project is starting also. This new project has the name "Starlight." It is a project that is contracted with the Department of Defense of the U.S. Government.

The following are some statistics relating to the project:

- 1) Total Cost  
\$1,250,000,000
- 2) Total Time to Completion  
5 Years
- 3) Number of Personnel  
15
- 4) Security Level  
Top Secret

"Starlight" is a system composed of computers that will track individuals, equipment, weapons, supplies, communications, etc., of military forces. It can also use diversionary tactics to combat missiles, etc. (similar to the Star Wars project, only better but cheaper and certainly within the realm of possibility). "Starlight" will revolutionize warfare in that generals can sit in a conference room and know where every soldier, tank, jeep, radio, plane, missile, and box of MREs is at any given point in time. Injuries and identification of injured and killed are known immediately. It is a satellite-based system in which weather and clouds will not play a factor in the accuracy of the system. It is the "warfare and defense system of the future."

Your job is the Chief Financial Officer/Chief Computing Officer. You report directly to the President, Steven Skyler. Since this is a government contract, the records must be kept in a meticulous manner with no error. Reports to the government and the Board of Directors for the company are your responsibility."

A Year In The Life Of .... is simply a way to introduce a simulation that could be related to any type of industry. The aerospace industry was used in this original effort but this could easily be expanded to include many different types of industry and the individual problems peculiar to a particular industry. Inclusion of everything imaginable that takes place in an office setting, from petty theft, office affairs, natural disasters to industry espionage has been included in this simulation. Everyday is a different challenge. Some day's, just information is given and the student has to decide if the information is of value to them in some form. Should it be included in the report or just ignored?

The individual applications of Word, Excel, PowerPoint and Access are used to produce all of the reports, payroll, correspondence, presentations, etc. that are used daily in the life of any business. Most students learn what they "need to learn" to pass an exam, etc. Since students learn at different rates and in different ways, this project allows them to be an "independent learner."

An example of some of the challenges faced by the students is how to handle items not familiar to them such as quarantining of the entire facility from threat of a highly contagious disease, flooding of the basement where one of the teams is located, office affairs between two of the workers, surprise visits by VIPs, etc. In a real work environment, all of these challenges and many more actually occur and must be dealt with in some manner. The challenge here is how do you handle the situation?

The pace of the project is fairly straight forward. The first quarter is spent organizing everything and everyone. Some disasters occur but yet life must go on and the organization must survive. The second quarter has some new surprises and challenges that are a little more complicated. The third and fourth quarter each has more and more complicated problems that must be solved through collaboration of effort as well as ingenious innovations on the part of the students. A timeline for the project would look something like:

- Week #1 - Get organized with teams
- Week #2 - Produce the forms needed and make video
- Week #3 - Set up tables, payroll, etc.
- Week #4 - Start on the 1<sup>st</sup> Quarter
- Week #5 - Finish the 1<sup>st</sup> Quarter, quarterly reports
- Week #6 - Start on the 2<sup>nd</sup> Quarter
- Week #7 - Finish the 2<sup>nd</sup> Quarter, quarterly reports
- Week #8 - Start the 3<sup>rd</sup> Quarter
- Week #9 - Finish the 3<sup>rd</sup> Quarter, quarterly reports
- Week #10 - Start the 4<sup>th</sup> Quarter
- Week #11 - Finish the 4<sup>th</sup> Quarter, quarterly and Year-End Reports
- Week #12 - Turn in Final Project

Interactivity between the instructor and the students occurs often. The instructor may

send invoices from a company that has done work for them and the Chief Financial Office was not notified in advance. An event may occur at a particularly busy time, there may be a surprise visit from some VIP, or anything else the instructor can dream up that may happen in real-life. This way the project can be changed from the written format and still maintain continuity.

There are certain required reports such as weekly, monthly, quarterly, bi-annual and yearly reports. All forms such as letterhead, accounts payable forms, financial statements, etc. must be designed and generated by the students. Any outside forms required such as the 941 Employers Quarterly Federal Tax Return are to be downloaded from the IRS site or the appropriate site depending on the form needed. Year-end reports will include W-2s, as well as other reports normally filed by a business such as the 940 Employers Annual Federal Unemployment Tax Return.

A two minute video was required having the students playing the different characters. Most seemed to pick up on the office affair and there were many different scenarios about the affair, most were hilarious. They had to write the script, act it out, edit the video and give it titles, credits and background music if desired. This was initially done to get them interested in doing the project. This was obviously a team project and was to be done with the same team that was going to work on the project together. The only real problem faced here was the scheduling of the studio we set up for the filming. Thanks to Brian Culver and Kinjal Shah, (two graduate students in Computer Science), the students were able to schedule studio time at night as well as during the day. The graduate students were there to instruct them on how to edit the video and give helpful hints on what and how to accomplish their goals. Since several hundred students were involved in this project, it needs to be noted that without good support from the department this project would be difficult if not impossible. Nearly all of the students indicated that it was a fun project and they enjoyed making the video.

#### 4. GRADING

The project was graded as its own entity. The completeness, organization, appearance, and accuracy were the cornerstones of the grade for the project. Any number of points could be assigned to the project and graded accordingly. The students were instructed to grade each member of their team according to the amount of work done, cooperation and getting their portion of the project done in a timely manner. The individual grades for each team member were averaged and the student received a grade based on the percentage they received. For example, the project was worth a 1000 points. If the team received a grade of 900 on the project and one team member received 100% from their team members, that student would receive a grade of 900. If a team member received a grade of 80 from their team members that student would receive 80% of the 900 points or a grade of 720 points. Students were also tested individually on the applications through tests administered.

The students felt that this was a very fair way to grade the project and liked the idea. This made sure that each member of the team "pulled their weight" and that "slackers" were not rewarded. There were instances where students received a 0 from their team members.

#### 5. STUDENT RESPONSES

Many of the students were initially overwhelmed by the project. However, with a little bit of instruction on how to break the project up into tasks, it became much less frightening for them. The comments from students were greatly appreciated and many of their suggestions were incorporated into the final project. Only the first quarter of the project was done as a test to determine the student reaction. Most found it challenging, many found it long and complicated. However, in the end most liked it and said that they enjoyed doing the project as is evidenced by the comments below:

Harleigh: "I have to say, at the first sight of this project, in addition to being overwhelmed, I vowed never to take another comp science class, if avoidable...but aside from the comp-literacy aspect of this pro-

ject, it has also helped me with delegating (because I always was the type of student to do everything my way...you see, because it was the ONLY way). Also, I inadvertently learned practical information, even though, it wasn't my priority...I was just trying to complete the project within the given time."

Ashley: "I think it did successfully do what you had planned for it to do, which was teach us about business forms and things we might have to do in our work place later on in life."

Casey: "This project was an interesting project that helped you bring back your imagination and learn what it feels like to have a real job and have to work with real people and around their schedules."

Jason: "As with any group project, you are forced to rely on other people to get the work done. I personally, feel the need to do all of the work in a group project just because I am not one to rely on other people. Overall, the project was good and I was satisfied with its quality."

Steven: "It was a difficult project but I learned a lot in Word, Excel, Access and PowerPoint that will help me in my future endeavors. I also learned that team work is the best way to get things done."

Sabrina: "I just wanted to commend you on your creativity for this project. It was intense and very challenging. I thought it was funny when the snow plow was needed in Houston, but I think these people would have had a nervous breakdown by the end of February, as all of the disasters seemed to happen in that one month."

Jennifer: "I thoroughly enjoyed working on my team. The work was intense and at times challenging. I really laughed with the quarantine incident. I hope in the second quarter Rachael becomes impregnated and has to take leave or maybe Steven Skyler could get fired for embezzlement, or perhaps an escape emu runs throughout the building gouging out people's eyes. Anyway, I am sure you have great plans for the future. I am just disappointed that I will not be able to follow the extensive legacy in the life of Starlight."

## 6. CONCLUSION

This course originally started out as simply a way to introduce the students to real-world examples and evolved into a semester-long project. Management of the course was a major obstacle at first until it was determined that student grading of team members was a viable solution and has been used in the past as is evidenced by Jacobs and others. Communication between team members was a challenge as well. Because some team members do not live on campus, this particular problem was solved by using class time to allow the team members to collaborate with each other on the project. Many class periods were devoted to explaining certain aspects of the project and then having the teams work out the solution to the problems.

Harriet B. Nembhard stated that "The goal of using cooperative learning in the classroom is to make the student stronger through interaction and communication around the process of academic inquiry. Students improve their thinking and problem-solving skills."

The overall reaction to the project was very positive in that it seemed to interest the students and challenge them to use their intellect in a way new to most of them. The large majority of students gave positive feedback when asked what they thought of the project. Marilyn A. Dyrud found that group work allows students to prepare for their careers in that many will be participants in formal work groups in the future. She said the group "allows them to practice their interpersonal skills in a relatively benign and supporting environment, while a peer review system keeps them alert to the impact they have on the groups as a whole" (Dyrud, 2001).

This scenario could be expanded to include others such as having the student assume the role of an intern working in various departments within a company. Another type of scenario could be a Floor Manager that requires input from a variety of departments. The list of different types of roles assumed by the students is limited only by the imagination of the author.

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