

USING WEBSITES TO ENHANCE COMPUTER LITERACY AND CURRICULUM DEVELOPMENT

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Traditionally computer literacy is seen as the mastery of skills, often from a list of computer skills deemed as necessary for success in using computers. That is, when discussing word processing skills we focus on how to cut, copy and paste. We then introduce various editing skills such as changing fonts, font sizes and styles. We might then teach about stylesheets, formatting, inserting graphics and tables. The teaching process culminates in exercises which allow the student to practice these newly acquired skills.

Although this is not an unreasonable approach, it seems to not matter which skill set is our goal, we tend to teach these skills from the same perspective. And we teach the skills from a grocery type list. The focus is on the skill and not on the process of how to use that skill.

An alternate instructional design would be to ask the student what they would like to build and then giving them the tools to do so. In this problem based approach, if the student were to identify a problem, the instructor would demonstrate the skill needed.

The end result is the same – the student learns the skills we want them to master. The process is different. The latter process is student-centered and forces the student to develop an understanding of how the tools work and not just what they do.

Rather than being the “sage on the stage” the instructor becomes the “guide on the side.”

STUDENT SAMPLE

Students in a Bachelor of Education General Methodology course were used as subjects for the study. The purpose of this segment of the course was to teach computer literacy skills and skills focusing on the use of computer in the classroom. There were four sections of the course, each comprised of approximately 35 students, randomly assigned to each of the four groups. Two of these sections, with sample sizes of 36 and 37 were used for this study. One section was taught how to build a website using the traditional approach outlined above while the second group was taught using the problem based learning approach. The task for both groups was to build a curriculum and/or educational website. Each student was required to build a website. There were no restrictions on the size and content of the website. Students were not given guidelines as to how many pages should be on the site, nor were a minimum and maximum number of pages suggested. Similarly, both groups were free to design their site to include images as they preferred. Finally, both groups could design the links from page to page and to other websites as they saw fit.

The entry skills of both groups were the same. The students knew how to cut, copy, paste and save files to a floppy disk. They knew how to copy text from other files and the internet. They knew how to copy images from other files and the internet. They knew how to insert images into text documents. The teachable areas from both groups were mixed in that each group consisted of students in mathematics, science, social studies, music, French and English.

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DESIGN OF INSTRUCTION

The control group was instructed how to build webpages in AOLPress. They were shown how to enter text and format text on pages, how to save pages, how to link to other parts of the same page, how to link to other pages, how to link to other websites and how to publish their site. There was ample discussion of “how to” and numerous examples were provided. The control group was provided with the two most commonly used hierarchies for simple websites. Students in this group were free to select a topic for their website.

The experimental group was instructed to design their website by first determining the content of their site. Instruction in AOLPress was minimal. They then set out to build their pages and only returned to the instructor when they had questions about how to accomplish a specific task.

Upon completing their pages, the experimental group discussed how to link the pages together. They arrived at the two most commonly used hierarchies for the sites under construction. Although there is nothing novel in the flow charts below it is important to note that the flow charts originated from the class rather than the instructor. After deciding upon the flow from page to page, students were shown how to construct those links.

Students in both groups were provided the same task and same general instructions, only the method of presentation varied. Students were shown how to save pages to a floppy disk. The class was instructed to save all items which were to be part of the site (images, pages) to the same floppy.

The final step in the process was to publish the websites. This was accomplished by FTPing the files from each students’ floppy to the university server. Although this process was technical in nature, students were walked through the FTP process. They clearly understood that this was simply another way of copying files from one location to another.

DATA COLLECTION AND ANALYSIS

Upon completion, websites were visited by data collectors who counted the number of pages on each site, the number of graphic images on each site and the number of links on each site. (Animated gifs and other visual embellishments were not counted.)

A one-way multivariate analysis of variance (MANOVA) was conducted using Group (control, experimental) as the independent variable and Pages, Images and Links as the three dependent measures. There was a main effect for Group, $F(3, 69) = 8.31, p < .001$. The subsequent univariate analyses revealed that all three variables were significantly different with larger scores for the experimental group (see Table 1) for Pages, $F(1,71) = 5.03, p < .05$, for Images, $F(1,71) = 23.64, p < .001$, and for Links, $F(1,71) = 13.28, p < .001$.

	Control		Experimental	
Group Size (n)	36		37	
	Mean	SD	Mean	SD
Number of Pages	4.28	1.03	4.92	1.38
Images per Site	7.39	1.96	11.32	4.45
Number of Links	8.72	5.40	14.95	8.76

Table 1. Means and Standard Deviations

DISCUSSION

Students in the experimental group produced more pages than those in the control group. This in part can be explained because the task of building a website originated with the students. That is to say, this group envisioned the final product and set about building it.

The experimental group also had more images on the site and more links. These may be an artifact of the first finding in that if a website has more pages than a second site it is likely that the former site will also have more images and links. However, a quick perusal of the means of this data shows clearly that this relationship, should it exist, is not linear.

The majority of sites in the control group were linked linearly while the majority in the experimental group were more hyper-dimensional. The latter were more likely to allow the user to jump to another page based on topic rather than merely to move to the next page.

The process of building the site was different for each group. The control group tended to look to the instructor for guidance on content. "Is this enough?" was a variation of a frequently asked question. The experimental group, on the other hand, tended to ask "How do I ...?"

One interesting observation is that students in the control group supported each other and provided each other instruction on how to complete tasks. After showing a few students how to perform a particular task, the role of the instructor changed to that of a reinforcer, that is, students would verify that they had acquired a new skill correctly. Students appeared very comfortable providing direction to each other. Although no data was collected at this time it is interesting to speculate whether students asked more questions of each other than they might have of the instructor.

The problem based learning approach appears to be more efficient in that the instructor spent less time in formal instruction and served as a consultant to the group. At the same time this approach was also more effective. Students in the experimental group were more prolific in building their websites. They had more pages, more images and more links.