

CREATING AND ASSESSING A WEB SITE FOR SCIENCE STUDENTS

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Abstract

This project entitled *Creating and Assessing a Web Site for Science Students* was created to facilitate the use of the Internet in the teaching and learning of Science at Lindsay Thurber Comprehensive High School. In order to accomplish this, different avenues for creating web pages were explored and a web site creation program called ADOBE Go Live 5.0 was learned and used to built the Science Department web site. The site was then uploaded to the district server and attached to the Lindsay Thurber web page. Teachers within the Science department introduced the site to students, and the students were given several months to use the site. Students were surveyed to determine the effectiveness of the site, how it was being used, and how the site might be improved for future use. The results of the survey show that students think the web site is well designed; yet it is not being used in a very significant way. Having students and teachers use the site is critical to realizing the value of this project. The challenge that lies ahead is getting students and teachers to use the site as a tool that can make teaching and learning of Science more efficient. This challenge will be met by involving more teachers in the vision of this project, posting information for students that they can only get off the site, and implementing changes to make the site easier to use.

Acknowledgements

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Introduction

This project was designed so students at Lindsay Thurber would be able to use the Internet as a tool for learning. One of Alberta Learning's Information and Communication Technology outcomes (Alberta Learning, 2001) requires students to have the skills to be able to access information on the Internet. With this outcome in mind a website was built to use the technology of the Internet to enhance the teaching and learning of Science at Lindsay Thurber High School.

There are advantages and disadvantages to accessing information from web pages when compared to the traditional method of classroom learning. One advantage of using a web site to provide students information, is that it is available 24 hours a day, unlike the traditional classroom. Another advantage is having the ability to seek information beyond the curriculum, if the learner wishes. The single greatest advantage of accessing the Internet for information lies in the large volume of information that can be accessed by students that have the proper training and are confident in Internet research. This can also be a disadvantage, but the website minimizes this by providing a list of curricular specific filtered sites.

One obvious disadvantage of providing information over the Internet is lack of student access to the Internet. Lindsay Thurber has tried to negate this by providing Internet capable computers in every classroom, as well as student computer carrels in the learning resource center. Another disadvantage is lack of easy to find quality information that is pertinent to students' studies. The web site addresses this problem by having teachers list sites that will be useful for students in their classes. Requiring students use the Lindsay Thurber web page to access everyday information and course specific

research will increase the skills and confidence that they will need to successfully navigate the world wide web.

Completing this project entailed learning how to design and build web pages and compile them as a web site for the Science department. The Science site was linked to the Lindsay Thurber home page and teachers from the Science department were to tell their students about the site and let them explore it. A survey, completed by students, was used to gather information on the web sites' effectiveness, how it was being used, and how it could be made more effective. This paper contains the results of the survey, and makes suggestions for the future direction of the site.

Background

Lindsay Thurber has over 2000 students and 18 Science teachers, consequently there is a need to introduce the Science department to the student body, and this is one of the purposes that the web site will serve. A web site is a perfect tool to accomplish this task simply because the logistics of a large student body meeting such a large Science staff are overwhelming. This is the type of non-curricular information that students can access at their own convenience. This site will provide students information about the content, prerequisites, and credit value of the multitude of different science courses offered.

Staff profiles, course offerings, and curricular links, all make the site a useful tool for information gathering and presentation. There are not a lot of Internet research projects planned within the Science Department, hopefully this project increases the number student Internet research projects. Another valuable aspect of this project will be the research and evaluation of online resources carried out by individual teachers for their personal web pages. Teachers will become aware of the scope, quality, and breadth of information that can be accessed by their students on the Internet. Once these resources are discovered, the teachers can then begin to think of ways to integrate them into their courses, and then into the classroom. Students will benefit by having quick easy access to well designed, course relevant sites. The number of teachers and students using the Science Department's web site for Internet research will determine the success of this project.

Design and Implementation of the Project Web Site

This project was started with no previous experience or knowledge of web design and building. It began with a review of the different tools that were available to design and build web sites. After reviewing simple programs like Netscapes' Composer, and others that explained how to write HTML, a complicated but powerful web design program by Adobe, called GoLive 5.0 (2000), was chosen to build the site. This program was chosen for both economic and personal reasons. Firstly, Lindsay Thurber had just purchased a site license for the software, and secondly, it seemed to be the easiest to start the learning process with. Next, a "How to" manual for GoLive 5.0 (Carlson & Fleishmann, 2000) was purchased and I completed tutorials and attempted to design pages and components for pages. After weeks of experimenting with the program enough competency was established to begin to piece together the website. Initially one of the largest obstacles to overcome was the lack of specific graphics for the site. These needed to be created and was a learning process in itself. The project was delayed as a graphics program had to be found, mastered, and then used to create all of the buttons and images for the website. Becoming proficient with the web creation and graphics software consumed a major portion of the time that it took to build the site.

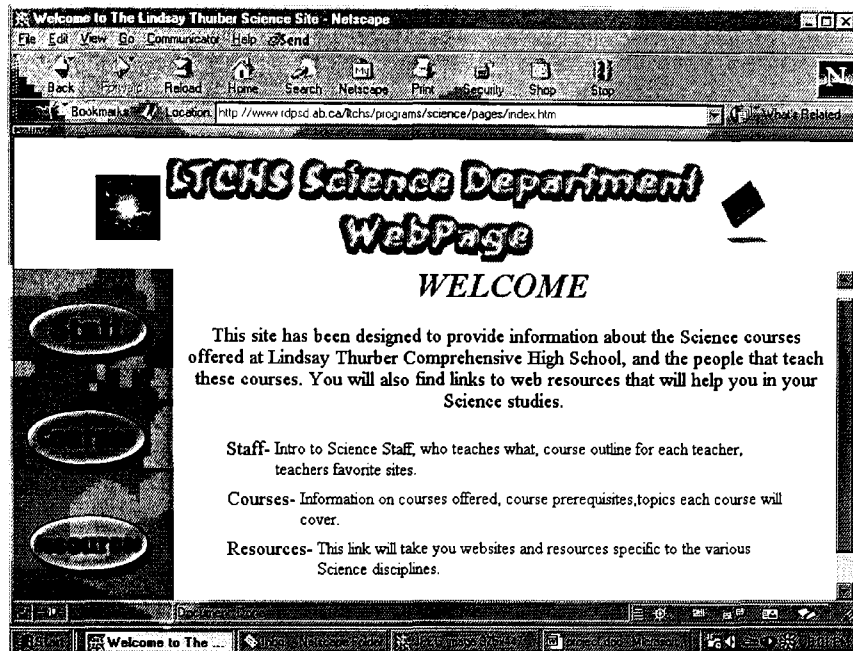


Figure 1. The layout of the home page of the Science Website.

The design/layout of the site is basic (See Figure 1). Using frames the site opens with an explanation of the purpose of the site and what information can be found on it. The site has three specific sections, each designed to serve a different purpose according to the goals of this project. Earlier it was stated that one purpose of the site was to make it easier for the 2000 students of Lindsay Thurber to know the Science staff members. The staff directory was designed to do this. This section of the site lists all 18 teachers in the Science department alphabetically and provides a link to each teacher's own page. The page may contain information such as a photograph, biography, hobbies, family, education, subjects taught and the links to Internet resources that each teacher uses.

The second section lists all of the courses that are available from the Science department, and gives a description of each course as well pre and co requisites for each course. This type of information is perfectly suited for an Internet site, because although it is important information, it quite often gets lost. Having this information on a web site will eliminate the need to ever hand out any more paper as long as the student knows how

to access the information. It will also show prospective students the types of courses that they will have access to by enrolling at Lindsay Thurber.

The last section is a list of web resources, categorized into Biology, Chemistry, Physics, Cool Science Stuff, and Teacher links. Each site that has been posted has been reviewed, and a brief description of the content was listed beside the link. As mentioned in the introduction, one disadvantage of using web pages is that they do not always contain the information or access to information that is required. In order to overcome this, the Resource section has been made interactive by posting a form (see Figure 2). This allows people that visit, to make suggestions about possible resources to include on the site. When the suggest a link button is pressed, a form pops up asking for the suggested sites' URL. There is a space to suggest what section of the resources to put the link in, and another to give a description of why the resource would be useful. This form gets posted to the web site manager where the link can then be reviewed for content and suitability and then added to the Science site. This form was made available to students in this study but was not utilized so it will not be part of the discussion section.

Welcome to Adobe GoLive 5 - Netscape

http://www.rdpsd.ab.ca/lchs/programs/science/pages/om2.htm

If there is a Science site that you use or find interesting, and want it included on these pages, use this form to submit it. Please include the category to which the link belongs, the URL (web address), and a brief description of the site and why you think it should be included on these pages.

Link Category	Biology Resources
Web Address	
Site Description	

Submit

Figure 2. Screen shot of the Form created to submit links that students and teachers find useful.

Once the web pages were completed they were tested on the Lindsay Thurber network. It was discovered that Lindsay Thurber had a wide variety of computers with different operating systems. The consequence was the staff section of the website, as shown in Figure 3, would not run properly on the older MacIntosh's at Lindsay Thurber, so an alternate page (Figure 4) needed to be designed. The architecture of the site is doubled up, because different versions of operating systems, computers, and web browsers will view different pages. By the end of February 2001 all of the problems were eliminated, the Science Department Web Page site was loaded onto the district server, and linked to the Lindsay Thurber main web page. The finished product can be viewed at the following URL: www.rdpsd.ab.ca/lchs/programs/science/pages/index.htm. I have also included the site on a CD as a submission with this project. The appendix gives instructions for accessing the site off of the CD.

The final stage of implementation involved having each Science teacher review the site, any errors discovered were then fixed. After minor glitches were worked out, the Science teachers were asked to provide each of their students with the URL of the site. Ostensibly the students would visit the site and use it for help in their courses over the remainder of the semester.

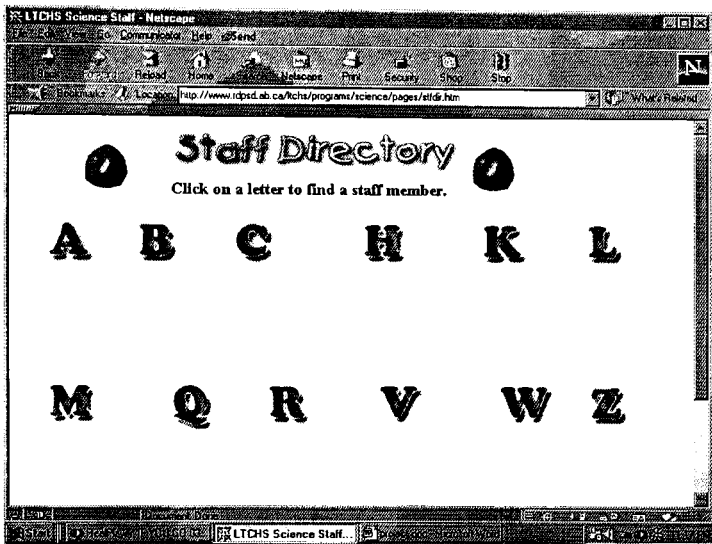


Figure 3. Screen shot of the Staff Directory that people using Widows operating systems, and Mac OS 8.0 and higher will view when accessing the Science Department website.

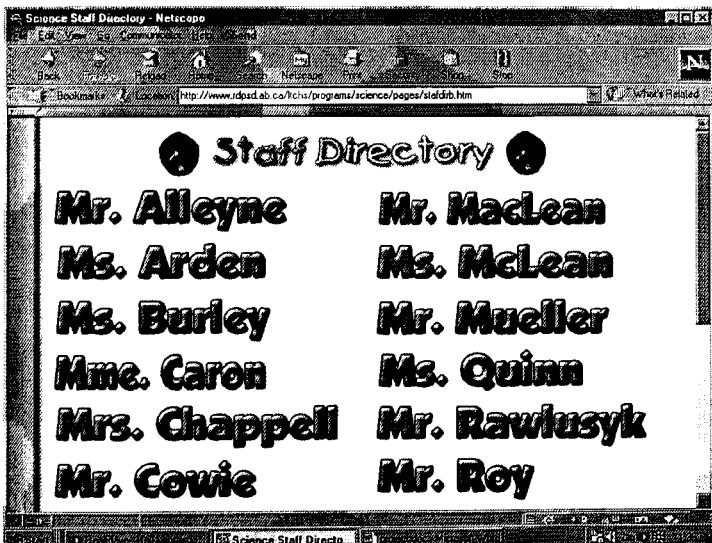


Figure 4. Screen shot of the Staff Directory that people using any Mac operating system older than O.S. 8.0 will view when accessing the Science Department website.

Assessment of the Project Web Site

The goal of this project was to facilitate the use of technology and the Internet in the teaching and learning of Science at Lindsay Thurber. In order to gauge how successful this attempt was, a questionnaire about the site was designed, which teachers then volunteered to have their students complete. The main purpose of the questionnaire was to find out if the site was being used, for what, and gather student perceptions on what could be done to improve the site. The following 5 questions were asked:

1. How many times have you visited the Science department web site?
2. What was your primary reason for visiting the website?
3. How useful do you find the web site?
4. (a) Which part of the website do you find most useful?
(b) Why did you find it useful?
5. (a) Which part of the website would you like to see improved?
(b) How would you suggest that it be improved?

The next section gives a general overview of the results of each question of the 109 questionnaires that were returned, and provides specific examples of the types of answers that were received about specific questions.

Question 1: How many times have you visited the Science department web site?

The overwhelming response to this question was once. There were seven people whose reply was twice, and two people responded with “several times”, and the rest only visited one time.

Question 2: What was your primary reason for visiting the website?

Again to this question there was a common theme to the answers. Sixty students replied that it was a requirement; another 25 stated they were doing research for a class project. Two unique answers were “looking for info on future courses” and “to see what information was available”.

Question 3: How useful do you find the web site?

The answers to this question, were as expected, varied. They ranged from 15 students replying “not very” to eight replying “extremely” with many responses in between. Sample responses include “Not really, It showed a lot of information, but I did not find what I was looking for.” and “Very useful if you new how to find it, but my teacher never told us the answers were in one of the links until two weeks before the end of the year”. Some other unique responses were “It was good for anyone interested in learning about our teachers”, “Useful. It has course outlines and info on current projects”, and “Well organized and straight forward operation.” and finally “ Easy to understand. Very useful in terms of info available.”

Question: 4(a) Which part of the website do you find most useful?

There was no clear picture of what part of the site students found the most useful. Many of the students liked the links that the teachers provided on each of their personal pages, one student replied “Good for finding review websites through teachers favorite links.” another student answered, “The page that lists all the names of the science teachers, also the fact that it tells you something about them”. Some student’s said that it allowed them quick access to websites relevant to what they what their teacher was

teaching. Others liked the section that explained what courses were offered, and the prerequisites required for each course “All of it, teacher info is helpful and you can find course outlines in their files”. A lot of students also commented about the links to specific topics found in the resource section.

Question: 4(b) Why did you find it useful?

The students had very practical reasons for choosing a favorite section. The message that the majority of answers provided was that what ever made the student’s job easier, they were going to use. For example, student responses include “You can get the answers to Bio assignments (Access Excellence)” and “Easy reliable sources of information”. Some students liked having access to lost information “many students tend to lose information (like course outlines), those with Internet access can easily look it up again” and “I had lost a course outline and found it on the web”. Still other students appreciated the fact that if you missed some classes you might be able to pick up information “If you weren’t here for a class you can see how to do problems” and “It was exactly what I was learning about in the classroom”.

Question: 5(a) Which part of the website would you like to see improved?

The answers to this question were relatively surprising, 80% of the students thought the site was good, as it existed “It was a good site for chemistry review, so I don’t think that it needs to be improved”. A couple students wanted all of the teachers to post their pictures, on their personal pages, as a few teachers chose not to. One glaring error was discovered when the class tried to project the site onto a screen using a digital projection device, so the entire class could look at the site at the same time. Apparently the style of font in the teachers’ section was very hard to read when projected. One

student suggested a search function on the site. This is a good idea and will be explored when the site gets updated in the future. Three other replies expressed the opinion that more graphics and effects should be used to make the site more exciting. For instance “The main part and the teachers profiles page, they are too plain” and “more color, better backgrounds”.

Question: 5(b) How would you suggest that it be improved?

There were several comments about trying to speed up loading time, an example of one is “less graphics so it loads faster”. Most suggestions were about how to make the site jazzier, like, “put music or something, or live examples of labs”. Two student also wanted the site advertised better “and advertise it just a little bit more cause most people don’t even know there is a site” and “easier to find the site”.

Discussion of Survey Results

The intent of this website was to enhance the teaching and learning of Science by using the Internet. The results of this survey are clear and the objectives of the project have not been met. Students simply are not using the website for its intended purpose, in fact they are not using it at all. One disappointment is that it has become clear that, for the most part students were not encouraged to visit the website as was expected. The results of the first two questions on the survey show that students only visited the site in class at the specific request of the researcher who developed the website, and then it was not used again. One explanation for this is that it may have been incorrect to expect the Science teachers to have the same level of enthusiasm for this project as the researcher. On reflection it should not have been assumed that teachers had done as requested, and there should have been checks for use from the beginning.

In order to rectify this problem, as the newly appointed Science department head, there will be a new format for course outlines that requires the web site URL to be built in. Another suggestion may be not printing the outlines and have the students access them from the teachers' page. The school divisions' web developer is also going to help place a counter on the page so that numerical data can be collected, to see if the page is being used. The approach I have described may work but I will also involve teachers, sharing the vision of what this site could become, and giving teachers release time to develop their own resources that can be posted to the site. This will allow Science teachers to take ownership of this project, by getting more involved in the revisions of the site. Teachers are more inclined to get involved if they feel that they have had input in the decision making process, and can get involved in the development process. Once involved

teachers will then involve their students in it as well. These ideas should ensure that each teacher show his or her classes at the beginning of the year that the site exists

The answers from the last three questions may not provide as much information as they would if the site had been used more often. However, they still help to show that the site was worthwhile and with more work it has the potential to develop into an important part the educational experience for Science students. It is difficult to gauge how useful students found the site, when the majority of students questioned only visited the site once. It is heartening that students seem to think that the site could be useful. Next year, after students have started to use it more frequently the suggestions about the overall usefulness should be more informed.

The answers to question number four on the parts of the website that students found most useful, seem to validate the feeling that the right type of information has been included on this site. This conclusion is based on the premise that if one of the three sections did not receive any comment about its usefulness then it probably wasn't. There was no clear favorite section on the site, as students equally identified different sections as being useful.

An interesting trend from the response to the question on how to improve the site was that students identified changes that they thought should be made, and these changes were very similar to ideas identified during the development process, but put off until further revision were to occur. There were also excellent ideas on new things to add, one of which, online quizzes is already being developed for next year. Again this question will provide even better information once students begin to use the site with more

regularity. When students depend on the site for information, it will become clearer to them what needs to be improved, and then more meaningful changes can be made.

Conclusion

Although the objectives of this project were not all met, the Science web site has been designed and implemented, and has received positive comments. This can serve as a jump off point for achieving the overall goal of increasing Internet use within the Science department. The challenge that lies ahead is to get both students and staff motivated to use the website as an everyday part of their science classes. The decision to build a website was made without teacher input, but the ultimate success of this project is going to depend on teachers buying into the idea that this site can make the teaching and learning of Science easier for their students. Several teachers have indicated they would like to post specific assignments on to their personal web pages. To use a biological metaphor, it can be said the seed has been planted and is beginning to germinate, and time will tell if it develops into a fruit-bearing tree. In order to allow teachers to take more ownership in this endeavor, release time is going to be given to teachers who volunteer to improve the site. This may include things like designing projects that can be accessed through the site, researching and adding to the resources section of the site, or even adding new sections and improving the architecture of the site.

To others who would like to develop a website similar to this, a couple of suggestions can be made. First of all, share the vision with people before you begin to develop the site. This will allow other teachers to get involved and insure that your site is used more effectively. Secondly, rather than trying to guess what the students may want in a site, go to the source. Ask students what it is that could be included in a site that would guarantee they use it

In conclusion, The assessment of the project has provided valuable information to improve the effectiveness of this tool. The next step will be to follow through on the recommendations of the assessment..

It should be noted that the Lindsay Thurber's administration was very impressed with the web site and has hired a person to design and maintain pages. The teacher web page that was developed for this project will be used as a template for every staff member at Lindsay Thurber next year. This will make it easier for teachers to get their materials on to the web, and further the use of the Internet as a tool for learning by all of the students at Lindsay Thurber and not just Science students. It is important to remember that this is a tool to aide in teaching and learning, one of the many tools that students and teachers have at their disposal. This project has ensured that Lindsay Thurber students and teachers now have access to this tool.

Reference

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Appendix

Instructions for Accessing Web Site From the CD

To access the website from the CD submitted with this project, you will need a web browser. Then do the following:

Personal Computer Users

1. Open the CD entitled LTCHS Science Department WebPage.
2. Open the folder titled *Science Website folder*
3. Open the folder titled *Science Website*
4. Open the folder titled *pages*
5. Double click on the file titled *index*

Macintosh Computer User

1. Open the CD entitled LTCHS Science Department WebPage.
2. Open the folder titled *Scienc~1*
3. Open the folder that is again titled *Scienc~1*
4. Open the folder titled *Pages*
5. Double click on the file titled *Index.htm*
6. Then choose your web browser program from the list that pops up.

STCHS Science Department WebPage

A Project for
By: Daniel Lower
001040317

