BIO110 – 111 Lab Website Project

Front – End Analysis Report

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Content: ***pages***

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Needs Assessment

The needs assessment focused on determining the ideal objectives for the finished product. In order to determine the ideal goals, faculty members involved with the project were asked to complete several statements that would lead to their own personal description of the project. Faculty members selected for the completion of the modified Delphi process that was to follow are described below.

Name	Credentials	Position
Mary Beth Voltura	Ph.D.	Assistant Professor – BIO110 Coordinator
Brian Rivest	Ph.D.	Professor – BIO111 Coordinator
Alaa Craddock	M.S.	Instructor – Biology Lab Coordinator
Shane Lotz	D.C.	Instructor – BIO110/111 Labs

The needs assessment yielded a subset of goals that falls into three different categories: 1. Content standards, 2. Design Standards, and 3. Sustainability Issues. The complete list is displayed below. For a complete description of the individuals answers in their entirety, please refer to Appendix A.

Ideal Objectives Created during Needs Assessment
Content Standards: 1. The website should be a useful resource including: a. Photos (specimens, dissections, models) b. Simulations (dissections, experiments) c. Study guides and handouts d. Useful external links e. Review materials (both general in terms of content, and instructor specific reviews) f. Lab objectives
Design Standards: 1. The site should have an accessible and intuitive user interface. 2. There should be a lack of redundancy. 3. There should be a uniform design (regardless of lecturer/lab instructor)
Sustainability Issues: 1. The resources need to be easily updated 2. The site should be used easily updated by a non-technical user. 3. The site should maintain a uniform design.

Learner Analysis

A learner analysis was conducted in order to better understand the demographic population of the students. Representative samples were selected in order to count the average demographics in BIO110 and BIO111 (N=264). For a more detailed understanding of the learning styles of the population, one section (N=144) was selected to complete a VARK learning styles inventory (http://www.vark-learn.com/english/index.asp).

The average demographics of the course show a slight imbalance in gender leaning towards females (56%). The majority of students enrolled in the course are freshman and sophomores (overall 81%). Additionally a majority of the students come from the school of professional studies (especially the Physical Education Certification program: 37.8% from the college and 19.7% from that major).

VARK scores are reported on a scale of 0 to 10 with 10 being most inclined towards a learning style preference. The mean scores (N=138) were as follows: Visual – 3.46, Auditory – 3.63, Read/Write – 3.82, and Kinesthetic – 5.37. Not surprisingly, the majority of this class prefers a kinesthetic learning style. In order to show a statistical difference between Kinesthetic and other learning style preferences, a one-sample ANOVA was employed. The result confirm a statistically significant difference ($p = .000$, $df = 137$).

For a more complete reporting of the data from the learner analysis, refer to Appendix B.

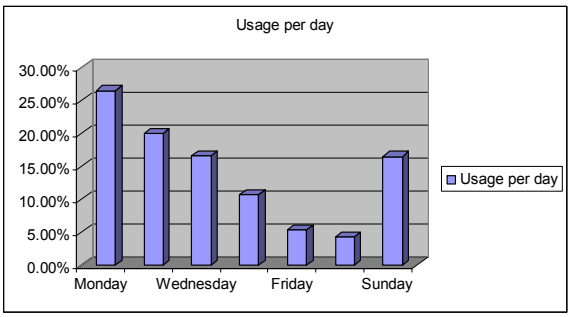
Technology/Media Analysis

A two prong analysis of the available technology was employed. The first analysis focused on understanding the usage statistics from a previous version of the BIO111 website. The second analysis focused on the available technology on campus.

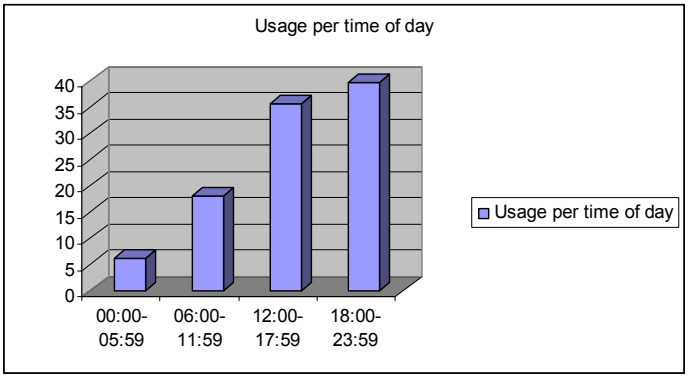
Website Usage Statistics

This data was collected during the Spring Semester of 2004. All reported data was collected by Nedstat.com. During the semester that this data was collected, labs were offered from Monday to Thursday of each week.

Daily usage numbers show a spike of activity starting on Sunday and declining by Wednesday (see graph below). This suggests that students are looking at the website before they attend lab. Perhaps this means that he website can be used to prepare students for lab with preparatory assignments. Additionally, this means that weekly postings to the website should be completed by Sunday (for the upcoming week) at the latest.



Additional reports show that activity on the website starts to peak around noon (see graph below).



For a complete listing of the website usage statistics, see Appendix C.

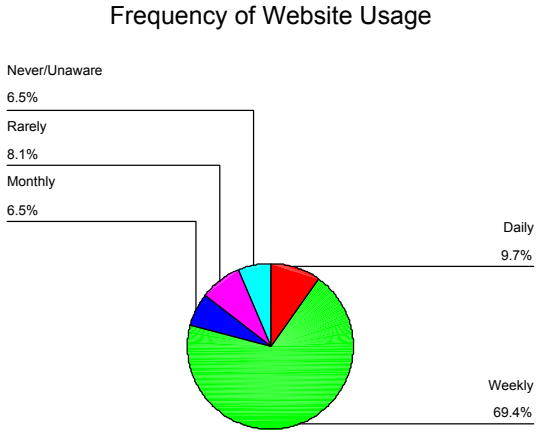
Available Technology on Campus

Still in progress…

Situational Analysis

A survey was given to a selected sample of students (N=62) currently enrolled in BIO111 in order to determine how the students currently use the website and what students might like to see on the revised website. Complete survey results can be found in Appendix D.

The average student uses the website on a weekly basis (70% of students). By far the most common use of the website is for review (74 % of students). Additionally, students use the current site to check their notes and to use pictures and diagrams (see graph and table below).



Question 2: What are some of the thing that you use the website for? N=62		
Response	**N**	**% of respondents**
Review	46	74.19
- Review: Practical	*4*	*6.45*
- Review: Dissection	*1*	*1.61*
Check Notes	23	37.10
Look at Pictures/Diagrams	12	19.35
Find out what's new	7	11.29
Check Assignments	7	11.29
Understand Concepts	4	6.45
Prepare for Class	3	4.84
Use links	3	4.84
Use Animations	1	1.61

Much of what students would like to see or see more of on the website revolves around more review including sample quizzes, instructor specific review, general review and sample problems.

Question #3: What would you like to see more of on the website? N=62	
Response	**% of Respondents**
Sample Quizzes	91.90
Instructor Specific Review	72.60
General Review	67.70
Sample Problems	62.90
Pictures of Models	50.00
Pictures of Specimens	37.10
Videos of Dissection	19.40
Other	17.70
Pictures of Experimental Results	9.70
Discussion Boards	9.70
Video of Experiments	8.10

Question 4: What would make you go to the website more often? N=62		
Response	**N**	**% of respondents**
More review	36	58.06
More pictures	3	4.84
Sample problems	3	4.84
Study Guides	2	3.23
Key Point Lists	2	3.23
Make use a requirement	2	3.23
Preview of the website	1	1.61
Knowledge of the website	1	1.61

Students did suggest some important possible additions for the website revision (included in the following chart).

Question 3: What else would you like to see on the site? Response: Other
More Dissection Pictures
Dissection pictures that ask the students to ID structure and function
Step by step dissection pictures
Correct answers to lab questions (2x)
Glossary
Crosswords

Extant Data Analysis

Two sets of extant data were analyzed to identify portions of the course that present more challenging content and to exam past student website critique.

Past Grade Analysis

Several sets of grades were collected for analysis. The grades represent data from over three years of both BIO110 and BIO111 labs. For each course, several instructors have been represented. The section averages were compared to determine if there were some tests that stood out as statistically more difficult. In order to determine the difference between the different sections, a one-sample ANOVA was employed. The test value was set at 72%, the accepted average for the overall course.

For BIO110, both quizzes 3 and 4 were found to be statistically more difficult than average ($p = .002$ and .001, respectively).

For BIO111, practical 2 was statistically more difficult ($p = .001$).

For complete statistical analysis, see Appendix E.

Past Course Teacher Evaluations (CTEs)

SUNY Cortland requires CTEs at the end of every semester. For several years, comments were collected that identified issues with eth BIO110 or BIO111 lab websites. Complete transcripts can be found in Appendix F.

The majority of the comments back up previously collected data (situational analysis). Most of the students use the website for some from of study or review. A

In general, most students also want more detailed pictures.

Recommendations

1. First and foremost, the rest of the design process must work in order to produce a website resource that meets the following overall goals:

Content:

1. The website should be a useful resource including:
    a. Photos (specimens, dissections, models)
    b. Simulations (dissections, experiments)
    c. Study guides and handouts
    d. Useful external links
    e. Review materials (both general in terms of content, and instructor specific reviews)
    f. Lab objectives

Design:

1. The site should have an accessible and intuitive user interface.
2. There should be a lack of redundancy.
3. There should be a uniform design (regardless of lecturer/lab instructor)

Sustainability:

1. The resources need to be easily updated
2. The site should be used easily updated by a non-technical user.
3. The site should maintain a uniform design.

2. Web content should be planned per lab/lesson. Much of the content emphasis should be on accessible forms of review for students: photos, practice problems, sample quizzes, content tutorials.

3. Based on the VARK results, there should be a significant portion of the website that has review in an active form (high kinesthetic scores).

4. Most students use the website on a weekly basis, and more specifically, most students use the website at the beginning of the week. Web content updates should be planned for early in the week before classroom delivery.

5. A separate account should be utilized for the website (separate from the Biology server) in order to make navigation and access to the website as easy as possible.

6. Pictures on the site should be updated to include orientation and more pictures should be added to include pictures helpful for review (i.e. no labeling).

7. Content delivery should be more focused for: BIO110 → quiz 3 & 4 content areas, BIO111 → practical 2.

8. Several new interactions should be added, to include more dissection pictures and in interactive glossary.

9. A permanent workstation should be dedicated within the department for adjuncts to access software designed to update the website including software from the following list.

Software	***Company***	***Description***
Contribute 3	Macromedia	Allows non-technical people to edit and contribute web content to an active account.
FlashPaper	Macromedia	Allows users to publish Microsoft Office Content in PDF or SWF formats.
Acrobat 6.0	Adobe	Allows users to publish Microsoft Office Content in PDF format.
Dreamweaver	Macromedia	Advanced web editing software.
Flash	Macromedia	Advanced animation software.
RoboPresenter	Macromedia	Converts PowerPoint presentations into SWF format.
RoboDemo	Macromedia	Allows users to create software demonstrations.
RoboScreenCapture	Macromedia	Screen capture software
Office Suite	Microsoft	
WSFTP		FTP software for uploading content.
Photoshop	Adobe	Photo editing software

Appendix A - Needs Assessment and Objectives Analysis

Modified Delphi of Project Team

Brian Rivest:
1) a website should be a source of material useful to the students (e.g. links to useful websites,study guides, etc.)
2) a website should be easy to navigate around
3) a website should not duplicate excessively what is posted on WebCT (I don't know if all faculty, like Barney or the adjuncts, use WebCT so this may be a point that deserves discussion. I post vocabulary lists on WebCT, but these easily could be posted on a course web site.)
4) the website should be easily updated by someone unfamiliar with creating websites. (Now, is that a tall order??!!)

Alaa Craddock:
I think what will make the site successful in my mind is if students feel compelled to use it as a resource automatically, without constant goading. I think the current 111 set up is better approaching that goal. I would like to see resources that remind students what they have seen in lab-- photos are excellent, or perhaps discussions/simulations of experiments. I would like students to become so proficient using the site that I could trust them to download work for class PRIOR to class. I think that will result from both content and site design.

I see the site primarily as a study/review tool rather than as being supplemental, so links or exercises that recall specific content is ideal. For instance, I gave my student a link during the enzyme lab that animated hydrolysis for them-- only a couple of seconds to run, but gives a visual aspect to the idea that they really cannot get in class... even a hands-on experimental lab. I am concerned that students do not get enough quality visual material to study with, and I see that as a primary potential strength of the website. In that way, the website can encourage problem-solving, and perhaps help out students who are challenged by learning aurally or from text. I think students struggle mightily to retain information that we see/use once... this is a really problem for one-day-a-week labs, and labs tht do not have an open lab component. So I would like to see the website be a resource for repetition (virtual dissection, virtual experiments, problem-solving plant identification, simulated animal behavior situations they could interpret, etc...).

Ultimately, most students will not use the website regularly and properly unless they feel it will directly affect their grade... so we've got to make them feel that way.

Random thoughts with many spelling errors. Hope it's useful though.

PS I also think the design of the site is critical to success-- I would like to see students be able to almost instinctively navigate to assorted information, without feeling as if they have to search things out. I think this "spatial" layout is probably the biggest challenge to doing a website for a large class (I'd certainly be terrible at it)... but I bet it has a major role in engaging students throughout the semester.

Shane Lotz:
-a place for pictures of specimens and dissections
-a place to download lab handouts
-review quizzes and practicals
-links to helpful websites
-class & exam schedules
If I think of anything else, I'll let you know.

Mary Beth Volutra:

Availability of hand-outs that were given in lab, so students have no excuses if they lose something. Perhaps posting statements of lab objectives (which should be the same for all instructors).

A uniform platform for each of the lecture and lab instructors (even if it's one platform/format for lecture instructors, and one for lab instructors). I think it's important that students get a comparable experience, regardless of instructor.

Summary Objectives:

Content:

1. The website should be a useful resource including:
    a. Photos (specimens, dissections, models)
    b. Simulations (dissections, experiments)
    c. Study guides and handouts
    d. Useful external links
    e. Review materials (both general in terms of content, and instructor specific reviews)
    f. Lab objectives

Design

1. The site should have an accessible and intuitive user interface.
2. There should be a lack of redundancy.
3. There should be a uniform design (regardless of lecturer/lab instructor)

Sustainability

1. The resources need to be easily updated

2. The site should be used easily updated by a non-technical user.
3. The site should maintain a uniform design.

Appendix B - Learner Analysis – VARK and Demographics

VARK Data

VARK Results, N=138

		Visual Score	Aural Score	Read/Write Score	Kinesthetic Score
N	Valid	138	138	138	138
Mean		3.46	3.63	3.82	5.37
Std. Error of Mean		.158	.185	.191	.182
Median		3.00	3.00	3.00	5.00
Mode		2	3	3	6
Std. Deviation		1.857	2.175	2.242	2.141
Variance		3.447	4.731	5.025	4.585
Minimum		0	0	0	0
Maximum		9	10	10	10

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Visual Score	138	3.46	1.857	.158
Aural Score	138	3.63	2.175	.185
Read/Write Score	138	3.82	2.242	.191
Kinesthetic Score	138	5.37	2.141	.182

One-Sample Test

	Test Value = 4.94					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Visual Score	-9.386	137	.000	-1.48	-1.80	-1.17
Aural Score	-7.073	137	.000	-1.31	-1.68	-.94
Read/Write Score	-5.875	137	.000	-1.12	-1.50	-.74
Kinesthetic Score	2.357	137	.020	.43	.07	.79

Demographics

Class Rank

Class	*N*	*%*
FR	105	39.77
SO	109	41.29
JR	35	13.26
SR	15	5.68
Total N	264	

Sex

Sex	*N*	*%*
male	63	43.75
female	81	56.25

Major by College

College	*N*	*%*
Professional Studies	100	37.88
Arts and Science	87	32.95
Pre-Major	42	15.91
Education	34	12.88
High School Student	1	0.38
Total N	164	

Majors

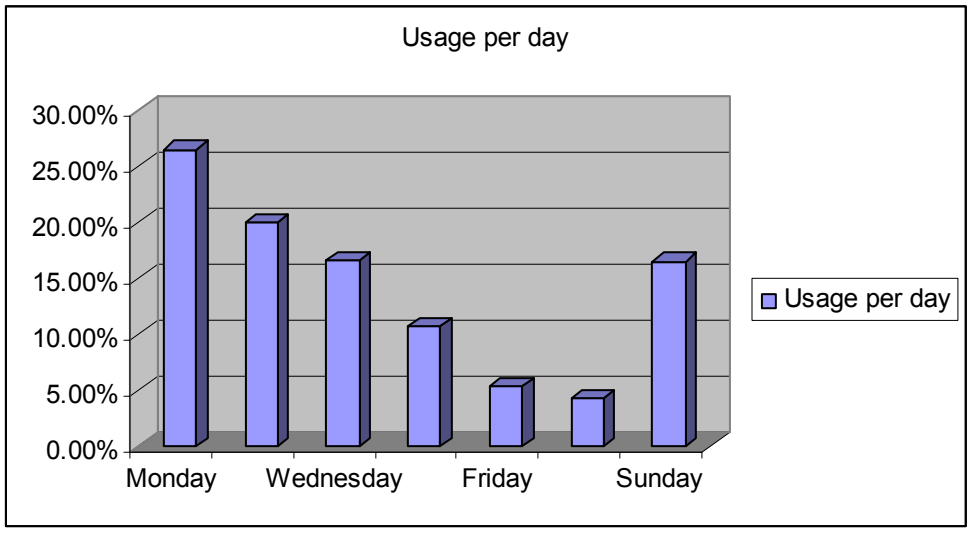
Major	***N***	***%***
Phys Educ Certification	52	19.70
Psychology	46	17.42
Pre-Major	42	15.91
Adol Ed	27	10.23
Athletic Training	20	7.58
Communications	11	4.17
Sport Management	8	3.03
Business Economics	6	2.27
Recreation	6	2.27
Speech and Hearing Science	5	1.89
Criminology	5	1.89
Childhood Education	5	1.89
Biology	4	1.52
Sociology	4	1.52
Kinesiology:ExerciseScience	4	1.52
History	3	1.14
Health Science	3	1.14
Sport Management	2	0.76
Political Science	2	0.76
English	2	0.76
Inclusive Special Education	2	0.76
Spanish	1	0.38
Art	1	0.38
Geology	1	0.38
Physics	1	0.38
High School Student	1	0.38
Total N	264	

Appendix C - Website Usage Statistics

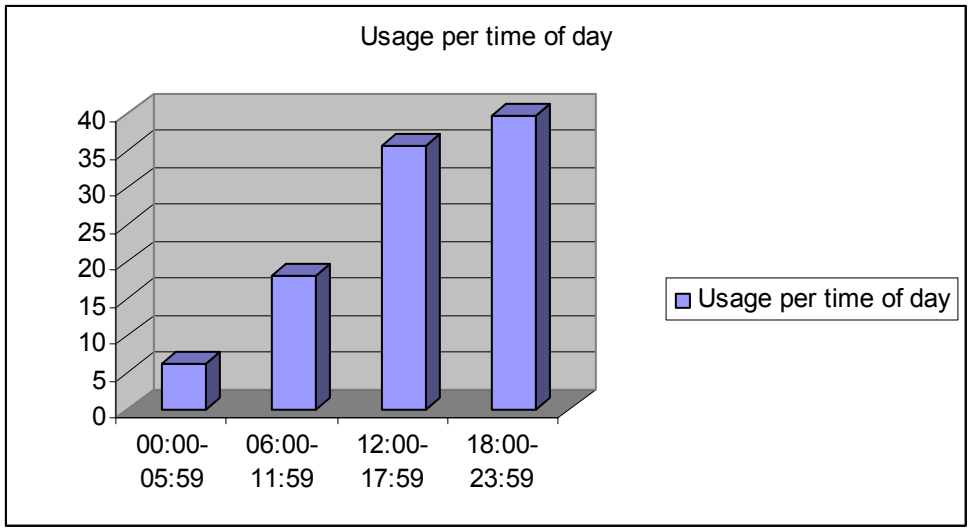
BIO111 Website – Spring 2004

Statistics provided by http://www.nedstat.com

Usage per day	
Monday	26.50%
Tuesday	20.00%
Wednesday	16.60%
Thursday	10.70%
Friday	5.40%
Saturday	4.30%
Sunday	16.50%
Total	100.00%



Usage per time of day	
Time	% of hits
00:00-05:59	6.2
06:00-11:59	18.2
12:00-17:59	35.7
18:00-23:59	39.8



Web Browser		
1	Internet Explorer 6.x	100.00%

Operating systems		
1	Windows XP	86.70%
2	Windows 98	10.00%
3	Windows 2000	3.30%
	Total	100.00%

Installed plug-ins		
1	Dynamic HTML Binding	100.00%
2	Windows Media Services	86.70%
3	Shockwave Flash	43.30%
4	Shockwave for Director	20.00%
5	VRML	10.00%

Screen resolutions		
1	1024 x 768	66.70%
2	800 x 600	33.30%
	Total	100.00%

Colour depths		
1	True colour	73.30%
2	High colours	26.70%
	Total	100.00%

Appendix D - Situational Analysis – Student Surveys Raw Data

What are some of the things that your use the website for?

- To see if anything new is posted.
- Review for practicals
- Review
- Check for upcoming assignments
- To help understand lab more in case I didn't understand something
- Review of dissections
- Lecture notes
- Review
- I read the lab information part and it really helps me with the main concepts we were supposed to get from the lab.
- Review is very helpful, too.
- I did not know about the lab website
- Check schedule changes
- Check updates
- Preparations for exams
- Notes, updates, quiz scores, review sheets
- Studying, reading over labs
- Review
- Review
- Diagrams and pictures of dissections
- Print out notes
- Review quizzes
- Review for labs, links for review
- Print notes
- Check for review
- Review schedule
- Review notes
- I use the extra links and for review
- Check the syllabus.
- Reviews and animations
- Review for the first quiz, practice questions, pictures and diagrams
- Check homework, Get study guides, print out notes
- Notes review sheets, answer keys, check assignments
- Review and pictures
- Notes and diagrams
- Review for each lab in case I missed something in lab
- Notices of test information, notes from class
- Check to see if I got all of the notes and to check Alaa's answers
- Review
- I did the quizzes on the heart (that was helpful), quizzes, looked at the pig diagrams
- Look at the diagrams and quiz myself

- Notes and pictures
- Review for quizzes
- Answers for worksheets
- Grades, notes, review, look at pictures
- Review for the labs
- Studying only
- Look at notes review
- General info
- Notes and content preview
- Information on office hours and schedules, when quizzes will be given
- Lab review
- Notes, review
- Notes, assignments
- Look at notes before class and quizzes.
- Use pictures and links
- Review, compare my answers from lab
- Look at notes
- Review for quizzes
- Practice questions for practicals/quizzes
- Answers for lab sheets
- Websites that have practice
- Notes and review
- Notes
- Review
- Notes and review
- Answer questions to lab, check questions
- Find contact information
- Review
- The pictures and quizzes
- Review sheets and writing assignments
- Notes, practice quizzes
- Review and notes
- Review for quiz 1
- Print out notes, study for quizzes and practicals

Others:

- Correct answers to the labs that we can check
- I don't like being referred to other websites for review, it should all be on one site.
- It was difficult to find a dissection picture of the pharynx
- Review of each lab with diagrams and sample questions for the quizzes
- Practice practicals
- Definition of key terms
- Answers to work for in class
- Crossword puzzles with lab questions
- Dissections pictures where you name the parts and the functions.

- Good pictures, but I couldn't orient the pig in the picture
- More direct information for help on upcoming tests – examples, pictures/diagrams, and motion pictures
- Actual pictures of the specimens from class
- Studying, writing papers, notes information
- I was unaware of a lab website
- Answers to the practical review
- Dissection pictures, step-by-step

What would make you use the website more frequently?

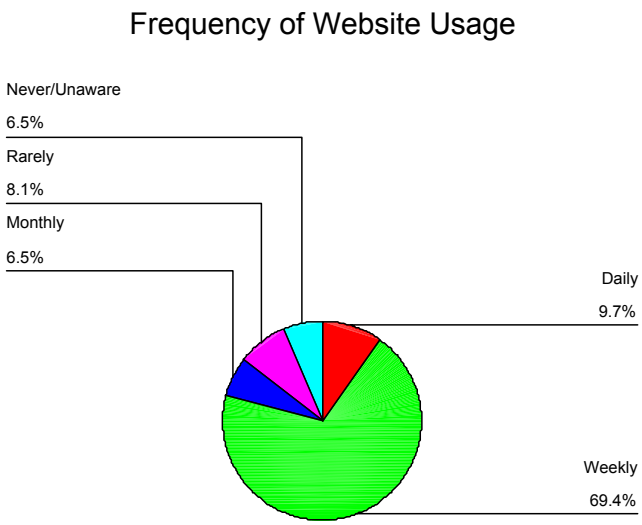
- More review
- More review
- Nothing, I use it everyday
- Quizzes of each lab we do
- Knowing about it
- If it was helpful in getting a better understanding of the material
- If it had more specific study guides.
- Clear, easy to follow study guides
- More review
- More review
- Key Points
- More pictures of specimens and models
- More review
- More review
- More sample questions
- If I had a preview of what was on the website
- More review
- If I knew that the animations and the review would be on the quizzes
- If I had to use it for assignments or review questions that could be handed in for extra points
- Practice quizzes
- Use questions from the site for quizzes
- Unannounced extra credit
- Sample quiz questions
- More review and practice questions
- More sample quizzes, diagrams (conceptual)
- My own lab instructors practice questions
- Review sheets, sample problems, quizzes
- Being reminded that I have access to it and not forget
- More sample problems
- More sample questions
- More review and answers to handouts
- Review, practice quizzes
- Random opportunities for extra credit, random review questions
- Review

- If review questions were posted for each lab
- More review questions
- More review
- Specific topics and questions and examples for quizzes
- Lab review
- More sample quizzes
- Discussion boards, instructor specific review
- Practice quizzes
- More pictures and models
- More quizzes
- More questions
- Review questions
- More review
- More quizzes
- Practice problems for tests and practicals
- Make it a requirement
- More frequent quizzes
- If I remembered to use it
- More sample quizzes
- More review sheets
- If there was a good review section
- Dissection pictures would be helpful for practical review. More time…
- If things were posted daily

Summaries
Question 1: How frequently do you use the website?

Frequency of Website Usage

		Frequency	Percent	Cumulative Percent
Valid	Daily	6	9.7	9.7
	Weekly	43	69.4	79.0
	Monthly	4	6.5	85.5
	Rarely	5	8.1	93.5
	Never/Unaware	4	6.5	100.0
	Total	62	100.0	



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Question 3: What would you like to see more of on the website?

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Question 3: What else would you like to see on the site? Response: Other
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Dissection pictures that ask the students to ID structure and function
Step by step dissection pictures
Correct answers to lab questions (2x)
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Appendix E - Extant Data Summaries

BIO 110 Quiz Scores

Descriptive Statistics

	Minimu	Maximu	Mean	Std.	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
BIO110 Quiz 1	58.9706	85.5556	73.1748	6.93332	-.252	.616
BIO110 Quiz 2	45.6300	81.1458	67.4369	9.37687	-.917	.616
BIO110 Quiz 3	56.4706	80.0000	64.2081	7.08444	1.245	.616
BIO110 Quiz 4	48.2353	73.4722	63.3829	7.13145	-.761	.616

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
BIO110 Quiz 1	13	73.174785	6.9333189	1.9229567
BIO110 Quiz 2	13	67.436862	9.3768687	2.6006755
BIO110 Quiz 3	13	64.208100	7.0844361	1.9648690
BIO110 Quiz 4	13	63.382900	7.1314536	1.9779093

One-Sample Test

	Test Value = 72					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
BIO110 Quiz 1	.611	12	.553	1.174785	-3.014978	5.364547
BIO110 Quiz 2	-1.755	12	.105	-4.563138	-10.2295	1.103247
BIO110 Quiz 3	-3.966	12	.002	-7.791900	-12.0730	-3.510818
BIO110 Quiz 4	-4.357	12	.001	-8.617100	-12.9266	-4.307606

BIO111 Quiz Scores

Descriptive Statistics

	Minimum	Maximum	Mean	Std.	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
BIO111 Quiz 1	61.0000	76.1667	69.210100	5.4620366	-.287	.752
BIO111 Quiz 2	57.7083	75.4783	68.760337	5.1465419	-1.435	.752
BIO111 Practical 1	56.2400	74.0000	67.004013	6.2633591	-.366	.752
BIO111 Practical 2	57.1667	69.1000	64.146463	3.6990159	-.562	.752

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
BIO111 Quiz 1	8	69.210100	5.4620366	1.9311216
BIO111 Quiz 2	8	68.760338	5.1465419	1.8195773
BIO111 Practical 1	8	67.004013	6.2633591	2.2144318
BIO111 Practical 2	8	64.146463	3.6990159	1.3077996

One-Sample Test

	Test Value = 72					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
BIO111 Quiz 1	-1.445	7	.192	-2.789900	-7.356277	1.776477
BIO111 Quiz 2	-1.780	7	.118	-3.239662	-7.542279	1.062954
BIO111 Practical 1	-2.256	7	.059	-4.995987	-10.2323	.240312
BIO111 Practical 2	-6.005	7	.001	-7.853538	-10.9460	-4.761083

Appendix F - Extant Data Analysis – Past CTE (Course Teacher Evaluations) Comments

- The website was useful and I found it to be effective means of contact with assignments.
- I feel that the website was extremely helpful and I like how you have review for the quizzes.
- Website is very useful but too broad.
- The website was very helpful. It showed clearly the assignments and the due dates, and provided easy access to the course material.
- Hard time getting to the website for reviews and assignments.
- The website is helpful, especially for the writing assignments. However, some of the links didn't work at the beginning.
- I like that the website has assignments and study guides available. I like having things posted online as opposed to receiving them as handouts.
- The web page was good; helped get assignments and know what's going on.
- Review sheet were very good on the website.
- The website was very good when it came time to take the exams and lab practicals. It would help if there were a practice test on the website.
- The pictures on the website were helpful.
- The website should include lecture reviews for exams because the practical and lab quiz reviews were very helpful.
- Website was very helpful, could use a few more pictures.
- The website that is provided is very helpful for lab practicals and quizzes. I think that the material could be presented better. The text is annoying and would be easier if it went in page order.
- I have used the website once. It helped me study for the one practical. I will definitely use it again to study for the practical.
- The website was very helpful when studying for the tests. The only thing that I recommend is pictures that are blank along with the pictures with the terms on them.
- I used the website to study for the quizzes and the first practical, the pictures were very helpful. The only suggestion that I have is to put questions at the end of each lab.
- The website was very good, but I had a hard time accessing it.