

THE DEVELOPMENT OF A HIGH SCHOOL LEVEL ONLINE ANATOMY COURSE

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by

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## CHAPTER 1 INTRODUCTION

This online anatomy course was designed to be used by high school students who were unable to take the class by being present in a traditional classroom. Also, this course could be used as an ancillary to an anatomy class that was being taught traditionally or as part of a hybrid course.

The primary motivation behind this project was to increase the number of students that could be scheduled into an anatomy class. Anatomy is taught as part of our health professions academy during the student's sophomore year and is the foundation for the junior and senior level classes. There are approximately 690 students enrolled in the high school and the health academy has 62 students. We offer only one class of honors and advanced placement per subject area at each grade level. Our small school population, in conjunction with two unique academy programs and a small enrollment in our honors and advanced placement classes, creates a master scheduling problem. Our health academy students often have to choose between taking honors or advanced placement class or one of their academy classes. This problem has been resolved at the senior level by offering an online pharmacy technician class that can be taken any class period during the day. Juniors can take medical terminology as an independent study course during the semester that I am teaching it during another class period. The other junior class, Responding to Emergencies, can be taken through the American Red Cross or the American Heart Association if necessary.

Additional motivations for developing this course were to assist students when they went on homebound, give students more in-depth exposure to the subject matter, assist visual learners and to provide an avenue for ESOL students to obtain translations of lecture notes and other relevant materials. These concerns lead me to discuss these issues with my academy coordinator,

principal and the curriculum specialist at our school. They agreed that these were issues that could be addressed by having the flexibility provided by an online course. I contacted our Instructional Design department to ascertain whether or not we already had access to Anatomy through our current online offering and was told that the district did not offer it. Therefore, the only option available was to attempt to create it myself.

## CHAPTER 2 LITERATURE REVIEW

In today's educational system, opportunities for online education are more commonplace. Now, more than ever, primary and secondary educators are aware of the benefits available by utilizing this method of learning. Consequently, there has been a steady rise in its use. Online education has become an important enhancement for public, private, charter and home schools. Online instruction is typically offered in three different formats which allows for flexibility of use. Instruction can be entirely online, partly online with an occasional in-class meeting (hybrid courses), or teachers can employ online lessons as a supplement to their in-classroom instruction.

The benefits of online education are vast. It allows schools to boost the number of academic programs offered, as well as provides multiple levels of difficulty. This gives schools a unique opportunity to meet the individual needs of their students. Students can progress through courses at a level comfortable to them. Not only can students pace themselves academically, they can also pace themselves around their own schedules. Students who have jobs and other outside priorities can work around their busy schedules to obtain the same academic experiences as they would in the classroom. Online classes offer home-schooled students and smaller institutions a chance to offer courses beyond which will fit into their master schedules or that may be not be within their faculty's area of expertise or certification. It also allows the secondary education system to assist with the teaching of homebound students (students who are unable to attend regular classes because of some type of medical issue).

Based on my experience, online classes can help students develop time management skills. It has been my observation that taking strictly online classes requires students to possess the ability to intrinsically motivate themselves and therefore, it is not for all students. The technological advances that have provided fast growth of online education have also brought

about normal growing pains. Students' expectations have risen and educators' methods have changed. Many studies have documented the increased use of online education. One study stated that around 50,000 students were involved with some form of online course, which moves it ahead of other forms of distance learning and moves it into one of the favored delivery methods (Hadderman, 2002). Smith, Clark & Blomeyer (2005) indicated that K-12 online learning is rapidly growing. A 2003 national survey of school districts estimated 328,000 public school enrollments in online or video-based distance education courses. Cavalluzzo (2004) recognizes the same rapid growth in her report, *Organizational Models for Online Education: District, State, or Charter Schools*. Increased exchange of ideas is one of the vast benefits of online education. This benefit and many others are well documented. Mupinga (2005) looks at the progression of distance learning methods stating:

Although satellite and correspondence were once the primary means of distance learning, they have been replaced by video conferencing and completely online educational experiences. The most widespread approach to using the Internet for coursework is the course supplement, web-based, or hybrid model. This is a face-to-face course augmented with assignments, readings, discussion groups, and tests that are completed online. (p. 106)

Blomeyer (2002) clearly points out that "e-learning offers a potentially important resource for providing accelerated courses that otherwise might not be available, filling gaps in required course offerings, increasing graduation rates, and reducing dropout rates" (p. 3). It also makes note of the potential effect online education has on "the quality, efficiency, equity, and educational choices available to all American students – regardless of age, race, religion, or socioeconomic standing" (p. 2).

Cavanaugh, Gillan, Kromrey, Hess and Blomeyer (2004) suggest that “students in virtual schools showed greater improvement than their conventional school counterparts in critical thinking, decision-making, and time management. Among the benefits of distance education for school-age children are increases in enrollment or time in school as educational programs reach underserved regions, broader educational opportunity for students who are unable to attend traditional schools, access to resources and instructors not locally available, and increases in student-teacher communication” (p. 1). Hammonds (1998) elaborates further stating, “learning to generate questions, to design and create, to work in teams, and to hone other interpersonal skills has been an additional benefit of taking courses through the Internet. Students are also learning to adapt to higher stimulation and a faster pace” (p. 324).

Thomas (2001) points out: “While access to electronically delivered courses can benefit any high school student, it is most essential for the following types of students:

- Students attending schools that are unable to provide certain academic courses;
- Students who need an alternative to traditional education;
- Students who have some access to courses but want alternatives to courses offered in their high schools;
- Students with physical disabilities or students with prolonged absences from school because of illness; and
- Home-schooled students. (p. 3)

In reaching these students who might not otherwise receive adequate educational opportunities, we greatly improve the chances of a positive and successful educational experience. Distance education students have been found to have similar results in achievements as students in traditional face to face environments. (Cavanaugh et al., 2004). While there is no denying the

benefits of online education; it does have some negative aspects. Most of these can be attributed to growing pains, which time and experience will most likely correct. Up-front costs of implementing distant education are a big challenge. Some of those costs can be negated by teaming with other school districts, or states. This situation may be helped by the increasing number of studies that show the long-term cost savings.

One of the potential problems found in online courses is that online courses are very independent in nature, high school students are used to having someone monitoring their progress closely. With online classes, these students have to be more self sufficient and therefore these classes may have to include a way for the student to be monitored more closely. The best solution to this issue may be a hybrid course. A hybrid class is a combination of online instruction and assignments with occasional class meeting. With the occasional in class meeting the student can be monitored by the instructor more closely. In addition, the problem of some students needing the social interaction with their peers and instructor is also addressed. The hybrid classes that have been compared to strictly online classes showed a smaller percentage of drop outs (Mupinga , 2005). Hybrid classes allow for less disruption in a student's everyday life. This is due to the time and financial saving that is realized by not having to drive back and forth to class, find parking, or acquire child care. Today, students are not as strongly focused on their education, because of the increasing demands on their time and financial resources. Additionally, a growing segment of students include those returning to finish their high school education making up classes that were previously failed, or some that are just trying to graduate early. Thus, this has increased the need for more flexibility in courses and their schedules.

As time sees each of these challenges diminished, it will also see an improvement in the delivery of technology-based courses. The growth of online education shows no sign of slowing

down. Online education is becoming one of today's most popular tools in the educational system. The rapid growth, evident across the country, is due in part because it assists in providing for the needs of small rural schools, homebound students, gifted students, students at risk, and those students with special needs

## CHAPTER 3 DESIGN MODEL

I chose to use the ADDIE instructional design model for this project. I considered the ASSURE Model but it was more unit and lesson focused, and I needed a model that was better suited to course design. The main benefit of the ADDIE model is its simplicity and adaptability. This instructional design model lends itself to use with the majority of learning theories and therefore can be used to design instruction in every venue that requires training.

### *Needs Assessment/ Goal Analysis*

The first step in the ADDIE model is to use a needs assessment or a goal analysis. The problem was already evident and therefore a goal analysis was undertaken to identify potential solutions. The major problem that was to be addressed was the need to increase the number of students that could fit anatomy into their class schedule. Additional concerns were identifying avenues to assist students when they went on homebound, give students more in-depth exposure to the subject matter, assist visual learners and to provide an avenue for ESOL students to obtain translations of lecture notes and other relevant materials.

The general aim that I identified as important was to design an anatomy class that could be used either entirely online, as a hybrid class, or as an adjunct to normal instruction. The process I followed started with goal setting; I then refined those goals and ranked them in order of importance. The recommendations that resulted from this process were:

1. Identify a list of chapters to be included
2. Identify objectives for each chapter
3. Create a framework of instruction, for each unit, similar to my classroom
4. Create activities suitable for online instruction for each chapter.
5. Create or locate online quizzes and tests

## 6. Design assignments for evaluative purposes

The next part was to identify a typical learner for this course. This was an easy step, because the students that were taking this course would be members of the health academy. A student that is interested in attending this program must go through an application process. They must meet certain criteria in the area of behavior, school attendance, and academic performance. Therefore, their characteristics as learners remain stable from one year to the next. These students are in this program because they have some interest in pursuing a career in the field of health care or medicine. The population of the academy is primarily made up of the following demographics; 90% female and 75% percent African American. These students are typically in the 10th grade and have successfully completed high school biology. Additionally, the students will have to be familiar with computer operations, have access to the Internet from home, and be willing to attend a training session to learn the intricacies and workings of the class. The academy allows students to check-out laptops.

### *Design*

In the design phase I determined what content I was going to cover and how the material was to be presented. The content to be covered in the online course is the same material that is taught in my traditional Anatomy class each year. I elected to keep the information the same to maintain the consistency and quality of both classes and to reduce my workload. The students will be instructed in the following curriculum:

- Introduction to Anatomy
- Integumentary System
- Osseous Tissue and Skeletal System Introduction
- Axial Skeleton

- Appendicular Skeleton
- Articulations
- Muscle system

I used the same objectives, lecture notes, and diagrams that I did in my traditional classroom.

The online class has links to supplemental resources, practice quizzes and tests. There are also additional assignments for the online class to replace the daily quizzes that occur in the classroom. Extra assignments were created to enrich and enhance the students learning.

### *Development*

The development phase took the longest and is the phase that I feel will have to be returned to and adjustments made as this class evolves over time. I used the Blackboard Academic Suite™ course management system provided by The School District of Greenville County as a guide to set up the framework for this class. The course can be viewed by going to <http://blackboard/webapps/login/>. [username: mcbeeguest password: mcbeeguest] In the course content area I included the course information, course documents, assignments, and external links. In the course tools area I used the announcements, staff information, discussion board, and the email categories. The majority of the class material will be found within the course documents section, individual chapter heading, and beneath the assignment category (Appendix A, B, C)

### *Implementation*

The implementation phase was to be conducted with any of my students that were on homebound or who had scheduling conflicts with my normally scheduled anatomy class. To this point in the school year that has not occurred. So I used the information on the Blackboard class as an adjunct to my in class instruction. I brought laptops into the classroom and used one class

period to orient the students to the layout of the course. I showed them how they could download and print off the lectures and lectures and where to find assignments. Additionally, I showed them all the websites that they could use to review and prepare for quiz and tests. I also explained to them that with some of the websites will allow them to email their results and at times I will be requesting that they do that.

### *Evaluation*

The evaluation phase is an ongoing phase. The instruction and the design of the class were modified throughout the development of the course. The students provided feedback after their initial use via a survey and modifications were made. (Appendix D) At the end of the course this year and in subsequent years, the students will be continued to be asked for their input. As additional feedback is received from users adjustments will be made to enhance the material and the learning experience for the students.

## CHAPTER 4 RESULTS

Participation in the online class for this school year was not realized. There were not any students this year that could not fit Anatomy into their regular class schedule. Additionally, no student has been placed on homebound instruction as of yet. So as the semester came to a close, I decided that I would have to use the course as an adjunct to instruction in the classroom. I opted for the chapter on muscles. I preferred this chapter due to the fact that I had access to more activities and assessment options. In the past, the students struggled more with this chapter than any other.

I was able to obtain the laptop cart for use in the classroom for a three week period. The students were oriented on the intricacies of the laptops and the Blackboard system. They were shown where to locate all information related to the chapter. I walked them through each menu item and submenus. I demonstrated how to get to the assignments page and how to open the assignments and print them. This was all accomplished by connecting my laptop to a LCD projector and projecting the image onto a screen. The feedback from the students was informal at this stage. I questioned the students to ascertain any problems or concerns. I also surveyed the class to determine how many students had access to a computer and the internet from home. The survey revealed that only 84% of the students had computers and Internet available outside of school. Some clarifications were necessary regarding the log in procedure due to the fact that the in-school login procedure is different from outside the school. I instructed the students that their assignment for that evening was to attempt to login from home.

The second day we began the chapter. I instructed the students to go to the chapter objective section and we reviewed those. We covered a portion of the notes and went over a portion of the vocabulary in that section. I provided the students who did not have internet access

at home a CD with all the files. Plus, I made a printed version of the files available to any student who requested it, specifically those with no computers at home. The students were informed that they would have a quiz the following day on all information that we had covered that day. The students were queried to determine difficulties or questions with the program. They indicated that there were none. We had a few computer glitches during class time. One laptop kept losing the wireless signal and another computer kept timing out as it attempted to connect to the school district's Blackboard portal. Those issues were resolved by changing to the two of the backup computers.

The third day, instead of giving them an oral quiz, I directed them to a website to take an online assessment and had them email me the results. This was very successful. The students lobbied for using this method to take quizzes the rest of the school year.

The rest of the unit went relatively smoothly. The students enjoyed the variety of activities that went along with the class online and were excited about not having a quiz every day. There were the typical computer problems which were to be expected. One student could not log on from home during the entire unit. Technical support indicated that it was a problem associated with the student's computer, so there was no satisfactory resolution.

The students worked independently to research the major projects. The PowerPoint presentations were very well done. The brochures were also completed in an excellent fashion. The students worked in small groups when they were using Publisher® and PowerPoint®. This allowed the students who had worked with this software to assist those who had not.

The students did not have any difficulty with taking the online quizzes or tests. They also liked being able to quiz themselves on the other sites I provided and send me the results. However, in addition to the online test, I also gave a written in class test. I did that for three

reasons. The first was to make sure that they actually had comprehended and learned the material. The second reason was so that I could check the results from this year against previous years using the same testing instrument. Last, the written test was given because of the short length of the Blackboard test. It took considerable time to type the questions directly into Blackboard. The students scored slightly better on this year's written test in comparison to the previous two years.

The final survey (Appendix D) for this class was given after the chapter test. Overall, the students were very positive in their responses. (Appendix E) The main response that stood out was that 80% of the students felt like this mode of instruction allowed them to better-grasp the material.

## CHAPTER 5 CONCLUSION

I was quite disappointed in not being able to use the Anatomy class as I had intended it as a stand-alone course. Circumstances beyond my control prevented it. All the senior-level students who needed the class to graduate were able to take it at the regularly scheduled time. I decided at that point that any sophomore or junior who could not fit it into their schedule could wait until the following year to take the traditional class. I facilitate an online class in Pharmacy Technology with seniors who select this as their senior class. Based on my experiences with those students, I feel that the sophomores or juniors would not be good candidates for the online class, unless it was a homebound situation. Some of the seniors have trouble with self-motivation and time management. Consequently, I had to step in and guide the Pharmacy class more than I would have liked and I did not want to have this happen with this class, this year.

I made the adjustments that were necessary to modify the class and use it as a supplement to my traditional class instruction. Once that adjustment was made I was able to proceed with a clearer focus. The end result of using the course as a supplement was successful. The students appreciated a different instructional approach. They enjoyed the variety of learning activities and they indicated on their surveys that they would like to do more of these types of activities in the traditional class. They indicated that they would like to do more of that type of learning. I will be adding discussion board topics for discussion with each chapter and require a certain amount of interactions from the students per discussion topic. The students indicated that they would like to explore topics on the periphery of anatomy.

I was amazed at the amount of work involved in putting together a class for use online. I now appreciate why an entire design team should be used. I would also imagine that keeping the

class updated will also take up more time than in a traditional class. Some of the added work was because I felt like I needed to use a wider variety of activities and assessments in this format.

I gained valuable experience by completing this project and feel that if I were asked to create a course in the future that I could accomplish the task. I would however prefer to have a singular role in the process. I did not like serving as the subject matter expert, instructor and instructional designer. Depending on the subject I can fill any of these roles. Nonetheless, I feel that a group of individuals working together can produce a better product than a single individual.

One adjustment that I will make with this class is to purchase a test bank of questions that could be loaded into the pool manager of Blackboard and then used to develop the chapter tests. With the increase use of computer testing in our district and state, I feel that my students could greatly benefit from taking all of their chapter tests online. The outcome of the surveys combined with the test results clearly indicates to me that I need to carefully evaluate the continued use of Blackboard within my traditional class. The modest improvement in test scores in conjunction with the fact that the students perceived that it helped them learn the material is reason enough to continue its use.

## REFERENCES

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## APPENDIX A

## Course Document Section

 **Course Documents**

**Course Documents**  
[Anatomy Syllabus](#) (24 Kb)



[Introduction to Anatomy - Chapter 1](#)



[Integumentary System - Chapter 5](#)



[Osseous Tissue and Skeletal System - Chapter 6](#)



[Axial Skeleton - Chapter 7](#)



[The Appendicular Skeleton - Chapter 8](#)



[Articulation - Chapter 9](#)



[Muscle System - Chapter 10](#)

## APPENDIX B

## Chapter Section

 **Muscle System - Chapter 10****Power Point presentation**

[Muscle - general info](#) (63 Kb)

**Muscle-Name, locations, and functions**

[Muscle names, location, and function](#) (90.5 Kb)

**Vocabulary list**

[Muscle vocabulary](#) (44.5 Kb)

You may find this helpful in learning the vocabulary associated with the muscular system.

**Lecture Supplements**

[Key Information](#) (21 Kb)

Additional information that you need to be familiar with.

**Lecture Notes**

[Lecture](#) (96.5 Kb)

**Muscular System Objectives**

[Chapter 10 Objectives](#) (25.5 Kb)

APPENDIX C  
Assignment Section

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 **Assignments**

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**Chapter 1 Assignments**



**Chapter 5 Assignments**



**Chapter 6 Assignments**



**Chapter 7 Assignments**



**Chapter 8 Assignments**



**Chapter 9 Assignments**



**Chapter 10 Assignments**



**Chapter 10 Quiz**

Available November 28-30



**Chapter 10 Test**

Muscular system - Test will be available Dec 11-12



**A & P Class Survey**

Please be as honest as possible to assist the instructor in future. Survey will be available after the final exam and grades have been turned in :)

Available May 27-30

## APPENDIX D

Carolina High School and Academy  
Anatomy Survey

The purpose of this survey is to allow you to give your teacher ideas about how the Blackboard class can be more beneficial to you.

Directions: **Do not put your name on this survey.** Please put the school year you took this class on the line provided below. Indicate your level of agreement with each statement by circling one of the numbers.

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**School Year**

**1 is Strongly Disagree, 2 is Disagree, 3 is Neutral, 4 is Agree, 5 is Strongly Agree**

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. It was easy to find my way around the course                   | 1 | 2 | 3 | 4 | 5 |
| 2. Class assignments were clear                                   | 1 | 2 | 3 | 4 | 5 |
| 3. Websites referred to were helpful                              | 1 | 2 | 3 | 4 | 5 |
| 4. Instructions were clear  | 1 | 2 | 3 | 4 | 5 |
| 5. A variety of activities were used                              | 1 | 2 | 3 | 4 | 5 |
| 6. I liked taking a course partly online and partly traditional   | 1 | 2 | 3 | 4 | 5 |
| 7. I liked using the computer in class                            | 1 | 2 | 3 | 4 | 5 |
| 8. Assignments, lectures, and links were easy to find             | 1 | 2 | 3 | 4 | 5 |
| 9. I feel that I better understood the material using this method | 1 | 2 | 3 | 4 | 5 |

10. If you could change anything about this class to make it better for future students, what would it be ? \_\_\_\_\_

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11. Please list any dead links that you came across

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## APPENDIX E

Survey Results  
December 11, 2006

25 Respondents

**1 is Strongly Disagree, 2 is Disagree, 3 is Neutral, 4 is Agree, 5 is Strongly Agree**

1. It was easy to find my way around the course	1(0) 2(0) 3(1) 4(7) 5(17)
2. Class assignments were clear	1(0) 2(2) 3(4) 4(1) 5(18)
3. Websites referred to were helpful	1(0) 2(0) 3(0) 4(2) 5(23)
4. Instructions were clear	1(0) 2(0) 3(6) 4(8) 5(11)
5. A variety of activities were used	1(0) 2(0) 3(0) 4(0) 5(25)
6. I liked taking a course partly online and partly traditional	1(1) 2(1) 3(2) 4(3) 5(18)
7. I liked using the computer in class	1(0) 2(0) 3(0) 4(4) 5(21)
8. Assignments, lectures, and links were easy to find	1(0) 2(0) 3(7) 4(5) 5(14)
9. I feel that I better understood the material using this method	1(0) 2(0) 3(1) 4(4) 5(20)
10. If you could change anything about this class to make it better for future students, what would it be?	

Various responses

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11. Please list any dead links that you came across

None indicated

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