

# Enhancing Biology Instruction via Multimedia Presentations

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**Abstract** The Middle College for Technology Careers High School (MCTC) is an innovative high school of the future. The school prepares its students for demanding careers in an ever-changing technological world. The Cisco Networking program is the backbone of the curriculum at MCTC. The students are challenged everyday to use business and technological skills. A unique aspect of the cultural philosophy of MCTC, is to incorporate technology into all aspects of academia. One way of accomplishing this goal is by the use of interactive whiteboards in the classrooms. This paper will expose the readers to several ways of enhancing core academic courses with the use of technology. The use of the equipment in the classroom assists in motivating students, increases student achievement, and perpetuates greater interaction with subject matter.

This paper will attempt to provide the audience with insight on how the use of the internet, interactive whiteboards, and computer software can improve the quality of learning in a biology classroom. A videotape of students actively participating in their learning will be available for viewing and/or discussion.

Major aspects of incorporating technology in the biology classroom include motivating students, increasing student achievement, and greater interaction with subject matter. In today's society, students are constantly surrounded by many aspects of technology. Allowing the use of technology in the classroom, can make learning more meaningful and exciting. Once students have discovered a purpose and passion for learning, the drive for solving problems increases. Biology is a subject that contains an inordinate amount of abstract concepts. So, using the interactive whiteboards can aid in clarifying matters for students.

Science, in general, is a subject that has vocabulary that most students tend to tune out. Expanding avenues of science instruction and allowing more real-world experiences via multimedia can give students the tools necessary to reach higher goals in science. A successful student in biology should have exposure to hands-on laboratories, but when the situation does not always warrant the means for accomplishing this task, it is important to look for alternatives. As a means of enhancing the curriculum, the technology is priceless. The students can actually "see" concepts via virtual laboratories, they have the most current research/findings available, and they are taking a direct part in their learning.

The transition from traditional paper and pencil instruction to one where there is increased use of information technology (IT) does have to be a difficult one. Middle College for Technology Careers High School's (MCTC) central focus is integrating IT across the curriculum. The goal of the school is to focus on the future and the applications of various technologies. Due to the fact that biology, and most other science disciplines have very broad, abstract topics, it became apparent that the traditional way of delivering instruction could be revised. Implementing technology into the classroom seemed a likely solution. There are limitations, though. Just as with the development of any successful lesson, critical planning has to take place. The degree of implementation depends on the school's finances and resources. First, teachers should understand how, and perhaps why introducing certain aspects of technology could help students better comprehend topics in biology.

The use of technology in the science classroom should be carefully planned by the science department. Questions concerning the budget, storage of equipment, and teacher training can be placed on the initial agenda. The research on technology in the classroom is phenomenal. It will not take the place of in-depth explanations by the teacher, but it can certainly help to re-iterate the topic at hand. The appropriate computer and software applications need to be addressed, and to exactly what lengths will the IT be used in the classroom.

One way of implementing IT into the biology classroom is by connecting to the internet to use the World Wide Web and access electronic mail (e-mail). The World Wide Web houses millions and millions of resources (websites) for students and teachers. There are many websites that can assist students with homework, special

projects, Advanced Placement exams, and science fairs. Classroom websites can be set up by teachers with the syllabi posted. In the biology classroom, time can be devoted to websites that specifically addressed the concept being studied. This can yield intellectual discussions in the classroom between teacher and students or between students. The information is current, but one must remember to thoroughly investigate if any information from the internet is to be extracted. Complex diagrams or chemical formulas can be obtained via the internet for student use.

A second way of implementing IT into the biology classroom is incorporating interactive whiteboards. It has the potential to increase student participation, and their responsibility for learning. The students are more attentive and willing to yield input. The interactive whiteboard affords a teacher the opportunity to give details by using on-screen highlighters, markers and erasers. Once a point or topic (such as the steps in the carbon or nitrogen cycles) have been introduced, the teacher can save a particular slide and immediately return to it for re-teaching. When using a blackboard, this option is not available and valuable time passes as the teacher tries to re-create an illustration.

Today, textbook publishers have a vast wealth of technology resources to accompany their textbooks. One of which includes virtual laboratory simulations. These can be used as demonstrations on interactive whiteboards or on individual computers in the classroom, if a sufficient number of computers are present. Students are quite eager to try out the technology and explore its features. Dissections are another aspect of biology that can be addressed by using technology. Virtual dissection programs can be found on the internet or they can be purchased. Again, intricate attention to detail can be pointed out if the interactive whiteboard is used when the teacher is giving an explanation. This also eases the tension between teacher, parents, and school administrators when it comes to the morals and ethics of dissections at the high school level.

For classrooms where the number of computers are limited, the use of the interactive whiteboards is incredible. When students are asked to come up and solve problems or demonstrate a skill, their work can be saved and printed so that they may take ownership of their accomplishments. Often times students will ask for a copy of their work.

Biology is a subject that involves many processes such as mitosis and meiosis. These topics can be unusually difficult for students to grasp, so when a visual presentation can be used, it goes a long way as far as comprehension. The difference between the interactive whiteboard and a video cassette recorder (VCR) is that the class is allowed to view the processes on a large screen and interact with what is actually happening. Getting the students involved in as many ways as possible, such as having them manipulate the interactive whiteboard helps them take control of the pace of their learning.

Finally, the daily use of computers and computer software. As teachers, we must present as many ways of learning to our students as possible. Lectures, laboratories, field trips, and computers are all helping our students succeed in school and in life. We must understand that technology is here to stay and it is involved in every aspect of our lives. If we allow our students to become familiar with the software available for biology (and other subjects), we can assist in opening their minds and increasing their critical thinking skills. The learning styles of students in any given classroom vary greatly. Therefore, if we include computers, we are helping to bridge the gap for those students who may otherwise tune out the subject matter. The students are working with the information, they have the "authority" over making decisions, and they can navigate the programs until success is reached.

The students at MCTC are constantly working on engaging projects and assignments. In addition to this, there is daily instruction that involves taking notes. In preparing for class, the organization of information is crucial. A teacher can approach the students in several ways. Research has indicated that students retain only a small percent of information from lecture, so we must seek other ways of gaining their attention. Daily notes or quizzes can be presented to the students in the form of PowerPoint presentations. This software program can be customized to fit any lesson. Pictures can be downloaded from the internet to make lessons more informative. If PowerPoint is used in conjunction with lecture, the students can be given the opportunity to focus on the written information before a lecture is started. When students have projects or oral presentations, they can use PowerPoint to accent the information that they are delivering. Also, it allows them to personalize their work if digital cameras or scanners are available. The use of these technological devices can allow the students to expand their horizons and take their work to a higher level. The students are quite proud of the work they produce when using PowerPoint and other similar programs.

In conclusion, the incorporation of IT into the biology classroom can be accomplished by approaching a variety of avenues. The complexity of the biology topics introduced can be overcome by connecting the biological principles to the students' "real-world" experiences.

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