The Use of Technology in Support of the Basic Sciences Labs at the Los Angeles College of Chiropractic

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The use of technology in the classroom has been a subject of great interest to health care educators. The literature provides many examples on how technology can support the educational process in various aspects of the health care field. On that basis, the Los Angeles College of Chiropractic began to find ways to implement technology in some of its classes. The purpose of this paper is to share the authors' experience on how technology is used to deliver instruction and develop testing material for the students. Some of the basic sciences labs at the Los Angeles College of Chiropractic have taken advantage of the available video and computer technology to develop instructional material for class presentations as well as setting on-screen testing for the students in histology, pathology, and microbiology laboratories. The developed instructional material and on-screen test material are available for students' use on the college's intranet, which can be accessed from on campus or off campus. (The Journal of Chiropractic Education 14(2): 68–70, 2000)

Key words: instruction, on-screen testing, technology

INTRODUCTION

The purpose of this paper is to share our experience at the Los Angeles College of Chiropractic (LACC) in the utilization of computer and video technology in the instruction and testing of students. This technology is used in three basic science course laboratories, namely histology, pathology, and microbiology. This paper shows how technology is used in these labs, including future/potential uses by the students.

MATERIALS AND METHODS

The basic method utilized in preparing lab presentations is to digitize images imported through the video-microscope (1), an external video camera or from 35-mm transparencies scanned through the Polaroid scanner. The scanned/digitized images are color enhanced, edited, and structures labeled using the Leica EWS 2100 capturing software and its editing utility programs. The images are then saved in a well formatted filing system, which allows the author to name and sequence the images for easy retrieval. The database of images is used to prepare a lecture/lab presentation using the "Slide Show" capability of the Leica EWS 2100 or through importing these images to Power Point software to create the presentation. The images could also be utilized to develop practical exams. Unlabeled images are used and the structure in question is marked for identification. The following is the system configuration:

- *Hardware specifications*:
  1. Intel Pentium 133 MHz
  2. 128 MhzSDRam/384 Max
  3. 8 GB hard drive

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4. Video card with 8 MG DRAM
5. SCSI card for Polaroid Slide Scanner
6. SCSI card for CD Writer
7. CD ROM 6X
8. CD Writer
9. Video converter from digital to analog
10. 17″ Monitor high-resolution super VGA with speakers and microphone
11. Video input/output capability with video input switch

- *Software specifications*:
  1. Windows 95
  2. Microsoft Office 97
  3. Leica EWS 2100 capturing software
  4. Corel Draw 8
- *Input devices*:
  1. Video microscope
  2. External video camera
  3. Sprint Scan 35″ scanner
  4. High-quality double-azimuth 4-head VCR
- *Output devices*:
  1. 27″ High-resolution monitors with video converter from digital to analog (8 wall-mounted monitors for students and a bench-mounted monitor for instructor)
  2. PVI-73 multiple-sync video marker
  3. Integrated infrared control system for output devices

In the histology lab, the system is used to support the following activities:

1. To deliver instruction using the video microscope or computer-digitized and enhanced microscopic images, which project at every monitor on the classroom walls (total of 8 monitors). A light pen is used to mark the various structures.
2. To run a slide show during the microscope viewing session. The show runs digitized images of the same slides viewed by the students under their microscopes. This serves as an "Electronic Atlas" which familiarizes the students with the various structures in their slides.
3. To run slide review sessions for the students before practical exams using the Electronic Atlas. The atlas comprises all microscopic digitized images they have encountered during their course of study. This drills the students and prepares them for the actual exam (2).
4. To conduct practical exams on the monitors. The exam is made up of a series of images, each projected for 1 minute. The students are seated at distances and given a question paper and a scantron paper to mark their answers.
5. To enhance self-directed learning and evaluation through the availability of videotaped and narrated microscope slides as well as the Electronic Atlas in the LRC for students' self-paced/independent learning (3).

The system is used to support the following pathology lab activities:

1. To run computer presentations of pathology slides, which demonstrate the macroscopic and microscopic changes, associated with systemic diseases as compared to normal gross anatomy and histology.
2. To conduct monitor-based practical exams to evaluate the students' ability in assessing pathological lesions.
3. To make Power Point presentations in the small-group Clinical Case Discussions by the students using the electronic projector. The screen is split to show the pathological lesion on one side and the clinical manifestations of the same pathology on the other half of the screen (4).

The system is used to support the following microbiology lab activities:

1. To run a computer presentation on pathogenic microorganisms integrated with the clinical picture of the diseases caused by those organisms.
2. To conduct practical exams to evaluate the students' ability in identifying various microorganisms as well as their ability to correlate the relevant clinical picture.
3. To make Power Point presentations in the small-group Clinical Case Discussions by the students using the electronic projector. This shows the clinical correlation between the pathogenic microorganisms and clinical manifestations of the presented clinical case (4).

Future plans to utilize this technology include but are not limited to:

1. Author academic software on CD-ROM to be used by students in the library
2. Development of academic courseware which can be included in the college intranet for students' self-directed learning
3. Development of assessment software for various courses to be available in the intranet for students' self-evaluation
4. Conversion of transparency slides for lecture presentations into digitized computer images for electronic projection in the classroom

5. Development of integrated software crossing various disciplines (e.g., anatomy, histology, pathology, microbiology)

DISCUSSION

The use of technology in the basic sciences labs has provided an excellent tool to deliver instruction to a large group of students (up to 70) regardless of where they sit in the classroom. It has enabled the instructor to project directly the various images from the video microscope, VCR, or the computer. This allows the students to ask questions to their instructor regarding the live presentation. The monitor slide shows of the different microscopic images, which run simultaneously with the microscope slide examination, allow the students to correlate between the structures they view on the microscope and the projected monitor images. The use of labeled images for reviews prior to the lab exams aims to drill the students relative to identification of the various components in each image and prepares them for the actual exam (5). The exams conducted on the monitors provide the best selected images, which could be viewed by all students at the same time. The risk of moving the pointer away from the structure or changing the power on the microscope is eliminated (6).

In the pathology and microbiology labs, the split-screen function helps the presenter to demonstrate the correlation between the basic science information and the clinical cases presented. Additionally, the availability of instructional material developed in video and computer formats in the institution's Learning Resource Center (LRC) provides opportunity for self-directed, self-paced learning.

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