Traditionally, neuroanatomy is a course heavily taught in the classroom setting in professional schools. Through the development of technology in multi-media and computer sciences, there are computer-based learning and teaching tools available for a neuroanatomy curriculum. However, after examining these neuroanatomy programs either freely available through the web or purchased commercially, it becomes apparent that none of these programs can be used without any classroom teaching by experienced instructors. It is impossible for self-motivated students to learn these materials on their own. In my experience through teaching Mammalian Functional Neuroanatomy (VIBS NRSC 450), I have managed to integrate power point presentation (PPP) images of gross brain / spinal cord, brain/spinal cord sections, and microscopic structures, as well as a few video clips of case studies and animations in my classroom presentations. However, since the original images, video clips, and animations were in different formats, I had to stop PPP and upload a video clip or animation, which caused significant discontinuities in the classroom presentations, and significant time was wasted on solving technical difficulties. Therefore, it is critical to develop a web-based comprehensive functional neuroanatomy curriculum, such that it will be easier for a course director to use the materials in classroom teaching as well as for distance education. Students themselves can also learn neuroanatomy with instant online learning assessment.

From Traditional Teaching and Learning

Interactive nature of this learning program

Integrated video clips

To Web-based Teaching and Learning

Interactive web-based neuroanatomy program

Computer software used to generate this learning program

Organization of each learning unit:
- Each unit will start with a simple neurological lesion problem for students to contemplate, and a list of the objective and special terminology of a specific learning unit will follow. Any diagrams, illustrations, texts, animations, and video clips will all be built in.
- At the end of each unit, there are interactive quizzes related with neuroanatomical structures to access the students' basic knowledge.
- At the end of each unit, there will be clinical case studies to access the students' comprehensive applications of what they have learned.
- There will be integrative units for clinical case studies that will require students to integrate knowledge from different learning units to solve certain clinical case studies (e.g. spinal cord injury will require students to integrate their knowledge of sensory and motor systems).
- All of the learning units (especially the display of texts and neuroanatomy parts) will have audio narrations built in for auditory learners.

Progress:
- We have finished the entry of the main text, quizzes, clinical case studies, and anatomical images. We have also finished shooting the video clips on animal brain dissections and basic and clinical diagnostic examinations that have been transformed into web-based format. The next step is to integrate all the texts, quizzes, anatomical images and video clips into one web-based program. The following stage will be the most difficult task, which is to design 3-D animations for the illustrations of neuroanatomical pathways. At the same time, we will start to proceed the recording for audio narrations to integrate into the web-based program. The last stage will be the final integration of all the components and editing.

Acknowledgment

Louise Abbott, DVM, Ph.D. Associate Professor Veterinary Integrative Biosciences Montague Scholar 1997-1998 Dr. Abbott helped in creating video clips in animal brain dissections and neurological examinations on healthy animals.

Newell McArthur, DVM, Ph.D. Professor Emeritus Veterinary Integrative Biosciences Dr. McArthur produced the original Neurology learning CD with interactive features.

Mr. Bryan Murdock Student Worker Mr. Murdock assisted in creating this web-based learning program, last, images and data entry, and shooting video clips.

Jonathan Levine, DVM Assistant Professor Neurologist Small Animal Clinical Sciences Dr. Levine created video clips in clinical neurological examinations of small animal patients.

Charles Farnsworth, Ph.D. Clinical Assistant Professor Educational Administration & Human Resource Department Dr. Farnsworth helped in the development of this web-based learning program. He also serves as a consultant for this project to bridge the use of technology and traditional teaching, especially on the design of student learning outcome assessment.

Mary Harron, DVM former CVM faculty member Dr. Harron designed some clinical diagnostic questions that are integrated into the program for learning assessment.

This project is graciously supported by the Montague Center for Teaching Excellence Scholar Award and the Inquiry/Research-Based Education of Undergraduates Quality Enhancement Plan from College of Veterinary Medicine and Biomedical Sciences.