

INTRODUCING COMPUTER-ASSISTED INSTRUCTION IN WEST AFRICA

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Purpose: Describe the challenges and benefits of introducing computer-assisted instruction in a developing country

Introduction: Many educational challenges face developing countries. In 2006 we (Morton and Stensaas) traveled to Kumasi, Ghana and discovered these challenges first-hand. The purpose of our visit was to see if there was a way we could assist the faculty with the curriculum for the first 3 years of their 6-year program (UK system) at the KNUST School of Medical Sciences. We found that the Department of Anatomy had only one full time person for 140 medical students and approximately 120 students combined together in nursing, herbal medicine, medical laboratory technology and exercise physiology. In summary, the most difficult challenge was the shortage of faculty compared to the number of students and courses. We also found there was a computer lab with 20 underutilized Dell computers donated by the Gates Foundation. We proposed a plan for 2007 with the primary objective of decreasing the teaching load of the faculty while improving access to computer-assisted instruction (CAI) for students enrolled at the KNUST School of Medical Sciences.

Methods: To accomplish this goal we proposed to the Dean of the School of Medical Sciences and Chairman of the Department of Anatomy to introduce CAI into the KNUST basic science curriculum for first and second year students. However, to accomplish our plan we needed to overcome specific issues such as slow Internet connection speeds, power outages, and unreliable Internet service. We decided to use stand-alone applications that did not require the Internet. The initial effort was to introduce CAI into the anatomy courses: gross anatomy, histology, and neuroanatomy. In addition, we requested the Dean provide IT support staff for assistance with installation as well as continued support for the faculty and students after we departed. This was granted and in February with our anatomy CAI developer (Foreman) and our CAI material we arrived to install and introduce the necessary applications to the faculty and students.

Results: Upon arrival we met with the Chairman and using various methods we were able to introduce stand-alone players with the necessary materials. Using Adobe (Macromedia) Flash we were able to create applications for gross anatomy. These applications consisted of a muscle tutorial, digital dissector, osteology tutorial, cranial nerve tutorial, and a practice practicum. Furthermore, using Adobe (Macromedia) Authorware, we introduced a histology application. Lastly, using a QuickTime and a browser we were able to introduce two neuroanatomy applications as well as a stand-alone application from the University of Toronto.

We loaded software on the 20 lab computers as well as the Chairman's computer using an external hard drive. We demonstrated to the Chairman how each application worked. Following our demonstration, the Chairman began assigning modules for students to complete on their own. After one week students were moving through the material at a rapid rate. To manage the increased use of the computer lab (140 students) Cyber Café software was used that allowed students to log in for one-hour intervals. This allowed equal opportunity for students and was easy to manage for the IT staff.

All 260 medical students in the first two years were trained on using the applications in pairs (40 at a time) for their courses in histology, neuroanatomy, and gross anatomy. Most students already had computer skills and navigated through the programs easily and quickly. We also collected information using a questionnaire to determine the types of computer equipment used by the students and their computer abilities. After one week we left the external hard drive, with the application installers, for the IT person to load onto students' personal laptops so they could use the applications at home. Students in the other health disciplines were not involved this year. We plan to return next year and assess the success and see if the project can be expanded to other departments.

Conclusions: Installing standalone applications in the computer lab in Kumasi, Ghana provided an avenue for delivery of additional educational material to students who do not have extensive handouts, note taking skills, or current textbooks. Introducing CAI allowed students' to overcome limitations such as limited resources (14 microscopes and 14 cadavers) and few faculty. Students can now access the CAI material in the computer lab outside the classroom for study and review. We are informally logging student computer usage.

Future Directions: Future plans consist of introducing additional CAI material into their curriculum. This will be accomplished by including faculty from other disciplines such as biochemistry and involving faculty such as Bob Ogilvie who is offering his Virtual Histology Program as a core course tool for histology. Please consider this presentation as an appeal to "Slicers" to share material not only through the Internet, but also as stand-alone applications. We have to remember that sharing material via the Internet does not always allow access to everyone. Furthermore, we encourage other "Slicers" whose medical schools have "sister" institutions or international programs to visit developing institutions, discuss their needs, mutually design a plan, and then slowly implement CAI in increments. Such an international experience for a couple of weeks each year can truly make a difference.

Addendum: The following software was installed from The University of Utah: Practice Practicum, Muscle Tutorial, Cranial Nerve Tutorial, Osteology Tutorial, Digital Dissector, Histology Video Exam, HyperBrain, Neurological Exam; and from the University of Toronto: Functional Neuroanatomy.

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