

Improved Anatomy Teaching by the 3D Slicer Platform

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Abstract : Medical imaging technology has become an indispensable tool in many branches of the biomedical, health area, and research and is vitally important for the training of professionals in these fields. It is not only about the tools, technologies, and knowledge provided but also about the community that this training project proposes. In order to be able to raise the level of anatomy teaching in the medical school of Nouakchott in Mauritania, it is necessary and even urgent to facilitate access to modern technology for African countries. The role of technology as a key driver of justifiable development has long been recognized. Anatomy is an essential discipline for the training of medical students; it is a key element for the training of medical specialists. The quality and results of the work of a young surgeon depend on his better knowledge of anatomical structures. The teaching of anatomy is difficult as the discipline is being neglected by medical students in many academic institutions. However, anatomy remains a vital part of any medical education program. When anatomy is presented in various planes medical students approve of difficulties in understanding. They do not increase their ability to visualize and mentally manipulate 3D structures. They are sometimes not able to correctly identify neighbouring or associated structures. This is the case when they have to make the identification of structures related to the caudate lobe when the liver is moved to different positions. In recent decades, some modern educational tools using digital sources tend to replace old methods. One of the main reasons for this change is the lack of cadavers in laboratories with poorly qualified staff. The emergence of increasingly sophisticated mathematical models, image processing, and visualization tools in biomedical imaging research have enabled sophisticated three-dimensional (3D) representations of anatomical structures. In this paper, we report our current experience in the Faculty of Medicine in Nouakchott Mauritania. One of our main aims is to create a local learning community in the fields of anatomy. The main technological platform used in this project is called 3D Slicer. 3D Slicer platform is an open-source application available for free for viewing, analysis, and interaction with biomedical imaging data. Using the 3D Slicer platform, we created from real medical images anatomical atlases of parts of the human body, including head, thorax, abdomen, liver, and pelvis, upper and lower limbs. Data were collected from several local hospitals and also from the website. We used MRI and CT-Scan imaging data from children and adults. Many different anatomy atlases exist, both in print and digital forms. Anatomy Atlas displays three-dimensional anatomical models, image cross-sections of labelled structures and source radiological imaging, and a text-based hierarchy of structures. Open and free online anatomical atlases developed by our anatomy laboratory team will be available to our students. This will allow pedagogical autonomy and remedy the shortcomings by responding more fully to the objectives of sustainable local development of quality education and good health at the national level. To make this work a reality, our team produced several atlases available in our faculty in the form of research projects.

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