

# Development of a Virtual Slide Library in a Developing Country

Michelle Anne Encinas<sup>1</sup>, Erick Ducut<sup>2</sup>, Fang Liu<sup>2</sup>, Jose Ma. Avila<sup>1</sup>,  
Michele Diwa<sup>1</sup> and Paul Fontelo<sup>2</sup>

<sup>1</sup>Department of Pathology, University of the Philippines Manila College of Medicine

<sup>2</sup>High Performance Computing and Communication, National Library of Medicine

## Abstract

*A virtual slide (VS) is a digital representation of a histopathology glass slide. A significant technological advancement in the teaching of histopathology in medical schools, virtual microscopy might prove challenging for medical schools in low-resource regions of the world. In this project, we demonstrate a collaborative approach to developing a virtual slide collection using the teaching slide collection of an institution from a developing country and making it available on the Internet.*

## Background

Virtual microscopy (VM) is the process of digitally acquiring histopathology glass slides. It simulates the experience of examining a glass slide under a light microscope, VM is revolutionizing the teaching of histopathology and other related disciplines, making it an ideal tool for teaching at a distance and possibly telemedicine. For low-resource countries, VM has the potential to augment medical education and training. The main objective of our project was to demonstrate a collaborative approach of developing a virtual slide collection using the institution's own glass slide collection and making it available on the Internet for teaching.

## Methods

The project was done as a collaborative project between the Department of Pathology, University of the Philippines College of Medicine (UPCM) in Manila and the Office of High Performance Computing and Communications at the National Library of Medicine. The slides were sent by courier then digitized using a T3 ScanScope from Aperio.

A Web browser interface was developed using PHP and MySQL. Images can be viewed using any Web browser with Adobe Flash Player. Viewing on the monitor simulates examining the glass slides under a light microscope.

## Discussion

Evaluation of the program by the Department of

Pathology of UPCM included ease of use of the interface, quality of the images, and Web access and its limitation. Both educators and students provided positive feedback on the usability of the program in their medical training (Figure 1).



**Fig 1. A Pathology instructor in the Department of Pathology, University of the Philippines College of Medicine using the virtual slide collection from the NLM to discuss clinical cases with medical students and residents**

Because images of an entire histopathology specimen can be viewed on a monitor and allow multiple viewers to see the images simultaneously at different locations, VM promotes a collaborative environment and enhances discussion and learning. It provides equal access to students everywhere and anytime thus maximizing a student's study time. Digitized images can also be archived on a network server and shared with other schools especially those areas with low resources. Moreover, unique or rare medical cases can be shared with hospitals and schools where these types of cases are rarely encountered. Lastly, VM will allow medical schools to avoid the cost of purchasing and maintaining light microscopes and glass slide collections. Funds can therefore be allocated for other uses.

## Conclusion

Forming collaborative projects with educational institutions in developed countries allow medical schools in low resource areas to utilize the virtual microscopy technology. We were able to show that this concept is feasible and in the long run may prove beneficial for both parties.