Chapter 8

Virtual Microscopy in Haematology and Histopathology Education:
Virtual Microscopy in Science Education

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ABSTRACT

Virtual microscopy is a method by which real-time microscopic illustrations get transmitted digitally via computer networks. There is increasing evidence to suggest that virtual microscopy combined with other didactic methods in teaching make significant improvements in student interaction and curiosity in histopathology and haematology teaching. The introduction of virtual microscopy has opened up a big arena in the field of e-learning in histopathology and haematology curriculum. Case studies prove the technological benefits of virtual microscopy in interacting off-campus students and educators. Recent technological advances have improved the use of virtual microscopy and enabled them to complement students learning in class room as well as for routine diagnostics. In this chapter, the authors discuss the significance, usefulness, and limitations of virtual microscopy in education. In addition, the chapter has provided several technical considerations to develop a friendly web-based virtual microscopy tool in teaching.

INTRODUCTION

Due to the rapid transformation in university curricula, it's has been a colossal challenge to engage students solely by conventional face-to-face teaching. Integration of traditional teaching methods with digital, online or virtual modes of learning has emerged over last decade as one of the mainstream teaching tools in multiple disciplines especially teaching haematology and histopathology subjects. Digital microscopy tools combined with other didactic methods in teaching shown to have a significant role in improving student interaction and curiosity in teaching (Diaz-Perez et al., 2014).

This chapter will discuss the incorporation and use of virtual microscopy as a simulation based educational tool that could be optimised for enhanced student learning in haematology and histopathology teaching. The innovative ways of merging this technology with other technological mediums at Australian Universities will be the focus of this chapter allowing students are learning both off campus and on campus to complement their classroom directed morphology learning with self-directed learning.

BACKGROUND

Virtual Microscopy and Digitalisation in Haematology

Diagnosis of haematological diseases using blood film morphology microscopy and blood cell count analysis is a crucial skill for students under training to become medical laboratory scientists. Use of virtual slides in haematology teaching is instrumental in mimicking everyday laboratory activities of medical laboratory scientists in the haematology department. The concept of multiple microscopic fields of view and virtual/digital slides was first described in 1985 and later expanded during the early 1990s (Silage & Gil, 1985; Westerkamp & Gahm, 1993). A virtual slide is a large digital image of a section of the blood film to be examined. In the past, digital images of specific areas in a blood film have been used in the training and identification of pathological abnormalities. The virtual slide is a collection or in other words a 'real-time' virtual picture of the whole blood film to be examined (Figure 1). It consists of several high resolution/power microscopic images of areas of blood films stitched together using an image processing software. There are several advantages of using virtual slides in training and education over traditional blood slides:

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