MFA: A WEB APPLICATION USING ART FOR TEACHING
RESPIRATORY INFECTIOUS DISEASES IN VETERINARY SCIENCE

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Abstract

MFA (“Me Falta el Aire”/ I can’t breathe) is an application for teaching Respiratory Infectious Diseases in Veterinary Science created by a multidisciplinary team of Art, Computer Science, and Veterinary teachers based on an artistic presentation of histological images through interactive web design. Understanding the development and evolution of histological lesions in infectious diseases is useful for understanding the natural history of the disease. Histological images have been selected to represent chronological events in the development of the disease according to scientific and technical criteria and have been worked on to reinforce their plastic and artistic presentation to evoke emotions. This application can be used to improve student skills to make accurate observations of pathological findings and foster active learning in teaching Infectious Diseases in Veterinary Science.

Keywords: innovation, art, infectious diseases, web application, active learning.

1 INTRODUCTION

Infectious Diseases of Animals are central in the curriculum of Veterinary and other Health Sciences in Higher Education because of their frequency and the importance of their impact on health and welfare of animal and human populations. Its contents are basic for other subjects, such as Preventive Medicine, Public Health and Zoonoses, and Food Hygiene.

Respiratory infectious diseases are characterized by the development of histological pulmonary lesions that impede respiration. The lungs are the organs responsible for gaseous exchange between blood and air, that is, the physiological process essential for life called breathing. Lung alteration consequences are within a wide range from a lower weight gain of young animals to the death of the animals.

In this paper we describe an application to teach the group of Respiratory Infectious Diseases of Ruminants. The application has been created by a multidisciplinary team of Art, Computer Science, and Veterinary teachers under the title “Me Falta el Aire / I can’t breathe” (MFA).

2 MFA APPLICATION

MFA is an interactive application that uses an artistic presentation of histological images to explain to students and involve them in pathologic processes of respiratory infectious diseases of ruminants. The application is based on an artistic presentation of histological images through an interactive web design (Fig. 1).
Figure 1. MFA is an application to teach Infectious Respiratory Disease of Ruminants through an interactive web design.

Although this application uses a webpage design, it is not a webpage. The application has been created under a web design in order to facilitate its publication and accessibility by students and other colleagues, allowing the teacher to easily publish it in most of the e-learning suits, such as Moodle or Sakai. The application aims to be an interactive tool to teach Infectious Respiratory Disease of Ruminants, mixing the contents with an art representation of the disease images from an interactive perspective. In this way, some interactive elements where added, such as maximized photos, interactive photos gallery, and dynamic images.

This teaching material is based on an artistic presentation of histological images. Understanding the development and evolution of histological lesions in infectious diseases is useful for understanding the natural history of the disease. Natural history of the disease is the evolution of the disease from the exposure to the infectious agent to the end of the disease by the death or patient recovery. Histological images have been selected to represent chronological events in the development of the disease according to its natural history and also represent the most important pathological changes of the lungs in each of the diseases studied.

Histological images have been selected according to scientific and technical criteria and have been worked on to reinforce their plastic and artistic presentation to evoke emotions and to stimulate students’ visual thinking strategies. Histological images have enough plasticity and visual force to be used under an artistic presentation. Thus, the presentation has been worked on although the photographic histological images have not been modified. The application has an interactive interface that enable us to amplify the images at high resolution with different zoom percentages (Fig. 2).
Figure 2. Sequence of anatomopathological images amplification: a. image on the page without amplification; b. normal zoom, c. higher amplification.

Images are combined with short texts describing the most important pathological changes in each disease than can be seen through the images. These short texts facilitate the interactive use of the application by students through the Virtual Classroom, but application is thought to be used in the classroom by the teacher as the mediator.

The objective was not only to create a new type of teaching material but also a new proposal of teaching methodology in the classroom. This proposal is based on active learning by students. MFA application has been created to teach Ruminant Infectious Diseases through an active learning strategy in the classroom.
Teachers can use MFA to show images to the students in the classroom and ask them to observe the images. Teachers must be the mediator between contents of the application and the students giving them an active role in learning. Observation must be done under a protocol or strategy previously established by the teachers. We recommend using the Visual Thinking Strategy (VTS), which encourages group discussion of an art image. VTS is a methodology that uses art discussion to develop critical thinking, communication skills, and visual literacy (Housen, 2002).

3 DISCUSSION

The Humanities are increasingly being used in Science teaching. They have been used to increase students’ compassion and empathy in medical education. In addition medical schools have been increasingly incorporating the humanities as tools to stimulate dialogue, discussion, and awareness (Reilly et al., 2005). Reilly et al. (2005) have implemented VTS strategies with selected art pieces to stimulate cognitive thinking, team work, and critical learning in medical residents and faculty. These authors observed that this method appears to increase team building, listening skills, analytical thinking, and visual literacy (Reilly et al., 2005). A study conducted at Harvard Medical and Dental School in the USA concluded that formal art observation training improves medical students’ visual diagnostic skills (Naghshineh et al., 2008). The intervention consists of art observation exercise under the VTS methodology followed by lectures linking visual art concepts with physical diagnosis. In our case, an artistic presentation has been specifically created from histological images of the most relevant pathological findings in Infectious Disease. These images can be used to develop students’ skills using VTS methodology.

The application is a digital resource that has been published under a Creative Commons License (Aguilar Moreno et al., 2012). MFA can be used in interactively by students themselves, yet it has been designed as a tool to be used in classroom to foster students’ active learning.

The committee created by the Infectious Disease Society of America (ISDA) created to improve infectious diseases for teaching in medical schools observed that these courses often primarily depend on PowerPoint lectures and notes, combined with multiple-choice tests as their primary teaching methods (Southwick et al., 2010). These methods fail to stimulate active participation, collaborative learning, and two-way communication with the professor. Furthermore they do not respect students’ diverse talents and ways of learning (Southwick et al., 2010). The committee proposes a new approach that emphasizes active learning and understanding. The committee also embraces the principle that students benefit more from learning a few facts well and developing true understanding than they do from memorizing large numbers of facts (Southwick et al., 2010).

A similar situation occurs in Veterinary teaching schools where Infectious Diseases are also central and one of the most comprehensive courses in Veterinary curriculum. The MFA application, used in the way that we propose or similarly, can be a tool to foster active learning in Infectious Disease Courses. It has some of the characteristics of active learning. According to Bonwell, some of these characteristics are: students are involved in more than just listening, there is less emphasis placed on information transmission and greater emphasis placed on developing student skills, students can receive immediate feedback from the teacher and are involved in higher order thinking.

4 CONCLUSION

MFA is an application that can be used to improve student skills to make accurate observations of pathological findings and foster active learning in Veterinary Infectious Diseases teaching.

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