Teaching Students to Solve Complex Problems Based on Large Bodies of Information

Walter Hurley
Animal Sciences
University of Illinois, Urbana-Champaign

The Online Learning Module

- The course is ANSC 438, Lactation Biology. This upper-level course typically has 35-40 students registered each spring semester. Most students are juniors or seniors in Animal Sciences. Few students have significant backgrounds in the topic area.

- The cases used in the module are based on real-life case studies of dairy herd mastitis problems originally written by Dr. Dawn Morin (Veterinary Clinical Medicine, UIUC). The cases have multiple parts and are extensive in the detailed information about the dairy farms and their mastitis observations. Mastery is attained in an absorption of the mammary gland and is a major disease process in cattle.

- The information presented in the cases is presented in a step-wise manner, with many steps asking the student to print the page as a worksheet and record their thoughts and interpretation of the case.

- Each step is linked to a mastitis resource that provides background information about mastitis-causing bacteria, mastitis syndromes, detection, how the disease is manifested, general aspects of dairy cattle management, and other related topics. The resource is the course's online discussion component.

- Sections of the resource have been modified to directly relate the background information to situations of on-farm mastitis problems.

- The online module, with two case studies and the mastitis resources, forms the cornerstone for student learning to solve other complex mastitis case studies, and subsequently other case studies in lactation biology.

Asynchronous and Synchronous

- Students initially solve the two online cases prior to in-class group discussions. This is accomplished asynchronously and individually.

- Aside from this online activity, all other components of the module are conducted in a group setting.

- The class visits the UIUC dairy farm where students become acquainted with each other's knowledge by having them explain some of the terms and concepts underlying the cases.

- In-class, students initially share their observations, approaches, and conclusions in solving the online cases.

- Each group then assigns three additional cases to solve. Group discussions occur during another two in-class sessions.

- After the initial in-class session, students are asked to identify aspects of the mastitis resources that they do not understand. A lecture then develops to address these deficiencies.

- In the final session of the mastitis module, each group is responsible for the solution to their cases and for explaining each of their cases to the rest of the class.

FINDINGS

- Having students focus on solving a complex problem, rather than primarily memorizing a large body of information, provides the student with a framework in which to both recall the information and to apply the information.

- Using a case study approach to solving complex problems also encourages students to respond to multiple cognitive levels, in the process of deriving the cause of the problem, making recommendations for the dairy producer about how to solve their problem, and designing a mastitis control program to prevent the problem from recurring.

- It is important to teach students not only what information we think they should learn, but to teach them how they can best go about gathering that knowledge and how to get the most value from their learning efforts.

CONCLUSIONS

- Financial support: Teaching Enhancement Grant, College of ACES, Office of Academic Programs
- Mastitis Detective Module is part of the ANSC 438 Compass website. The same module can be found on the Lactation Biology website at: http://classes.aces.uiuc.edu/AnSci308/

Acknowledgements

- Financial support: Teaching Enhancement Grant, College of ACES, Office of Academic Programs
- Mastitis Detective Module is part of the ANSC 438 Compass website. The same module can be found on the Lactation Biology website at: http://classes.aces.uiuc.edu/AnSci308/