Scenario-Based Learning Environment (SaBLE) for Mycology

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Abstract

The role of medical laboratory scientists in fungal identification is done through macroscopic and microscopic observations of the species. Connecting the laboratory observations of the species and the clinical presentation of the patient will greatly help the diagnostic process. Students in the medical laboratory science program at the University of Minnesota do not have a wet laboratory experience connected to the mycology lecture. As an alternative to the laboratory experience, SaBLE (Scenario-Based Learning Environment) modules were developed to provide student with identification techniques. SaBLE is a supplemental tool that provides students with an interactive learning environment outside of the lecture setting. It enhances student learning by applying theories of feedback timing, connectivism, and gaming theory. For this project, an introductory SaBLE module was developed which includes images, diagrams, and knowledge check questions that students can use to expand their studying methods. Overall, the goal of the SaBLE module was to enhance student engagement with fungal identification and to improve their overall mycology experience.

Introduction

Medical laboratory scientists work on various pathogens, including fungi, with the identification of fungal structures being essential to the patient diagnosis. Currently, the medical laboratory science program does not have a laboratory course for mycology. SaBLE, a supplemental learning tool, can provide students with additional exposure to mycology outside of the classroom. The content in the SaBLE module is similar to the lecture material but presented in a different format. Learning theories utilized are feedback timing, connectivism, and gaming theory. Feedback timing refers to the immediate constructive feedback provided to a student. In the SaBLE module, a question is presented to the student, and direct feedback is given immediately depending on the answer. Connectivism learning theory is the gathering of information to form an understanding of the material. Within the SaBLE module, students draw connections from the lecture material and the supplemental content provided in the module to create a better understanding of mycology. The gaming theory, when used in e-learning environment, creates an informal, enjoyable way of learning material. The SaBLE module created an environment where students can draw connections, receive feedback, and learn in a safe and flexible environment which overall enhances the student engagement and ability to identify fungal organisms.

Methods

The SaBLE module focuses on basic mycology knowledge that is used to identify fungal organisms. Informational pages within the module discussed body sites, habitats, transmission, clinical presentation, and structural characteristics. Scanned images were inserted on the pages that gave the students a visual representation of what fungal structures look like under the microscope. Throughout the module, there were knowledge check questions where the students were asked a question and constructive feedback was given depending on the students' response. Students received points for the correct responses to the questions. If by the end of the module, not enough points were gained, feedback would be given recommending that the module be repeated. The format of the knowledge check questions were multiple-choice or fill-in-the-blank. The students were only allowed one attempt on each question. Detailed constructive feedback was given after each question based on the students' response.

Figure 1: Node Graph

The node graph displays the sequence of pages the students will potentially have to go through, and it also shows how the pages would be connected. The pages contain information with images or knowledge checks questions. The knowledge check questions are scattered throughout the node graph. There are three different colored arrows represented in the graph; those represent either a correct answer (green), a wrong answer (red), or a progression to the next page (black). Red arrows are directed to the previous page to review the information.

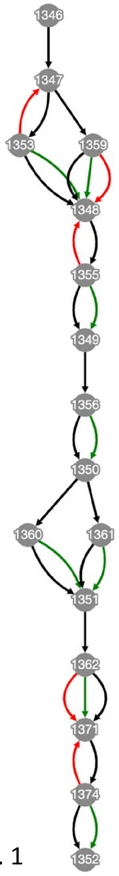

Fig. 1

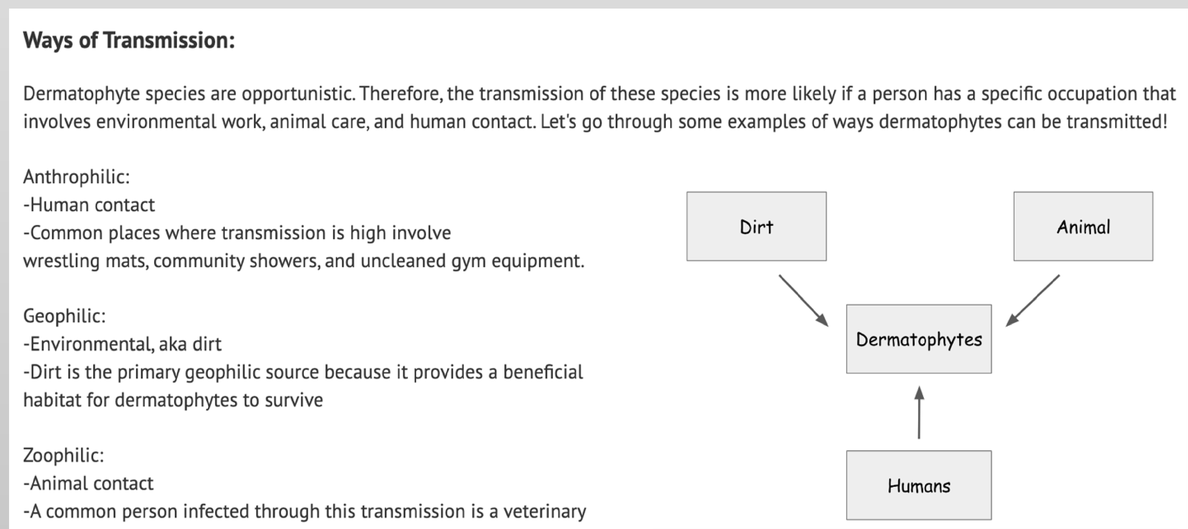

Fig. 2

Figure 2: Informational Page Example

The image above is a screen capture of the students view of the pages that will be seen throughout the introduction module of the mycology SaBLE. Text and images will be displayed; building up to the information throughout the module is a goal for the module. Following most of the pages are knowledge check questions which will display either a multiple choice or fill-in-the-blank question.

Discussion

The absence of a wet laboratory limits students' practice at identifying fungal structures. Using the SaBLE module as a supplemental interactive learning tool is a way for students to enhance their fungal identification skills with species introduced from the lecture. The module utilized feedback timing, connectivism and gaming theories to aid the students understanding of the mycology material. Also, the module focuses on fungal identification skills that are commonly used in the clinical setting. Overall, the purpose of the module is to provide a supplemental learning tool to the medical laboratory science students to use in their studies and clinical practice.

Conclusion

The SaBLE module aims to engage students with the mycology material in a comfortable online interactive learning environment. Throughout the interactive learning environment, the module gives students flexibility to progress through the module at their own pace but must be completed after reviewing the lecture modules. The SaBLE modules created connections, based on the connectivism theory, between the material taught in the lecture and the SaBLE module. The module should help the students lessen the limitations of not having a laboratory course with the lecture. The future use for the SaBLE module would be to create a challenge module based on the knowledge gained from this introductory SaBLE module. The challenge module will be a case study-based format which will apply the introductory information to scanned images for the purpose of identifying fungal species. Pre- and post-surveys will be administered in the future to measure the effectiveness of the module. Exam scores may be evaluated in the future to determine if the modules directly affect the students' success in the lecture course. Overall, the SaBLE module can be universally used in any educational course not limited to mycology courses.

QR Code for References

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