FEBRUARY 7, 2022

FACULTY SPOTLIGHT

Collaboration is the key to innovation.

Dr. Mark McKinnon

INQUIRY-BASED LEARNING

Thank you, Dr. McKinnon, for your willingness to share and collaborate!

Inquiry-Based Learning

Inquiry-based learning is a student-centered pedagogical approach that facilitates student engagement in the learning process. Although inquiry-based learning can be structured in a variety of ways, an essential component is that students become active contributors to the learning process. The students construct their own conceptual understanding, often by facing previously held misconceptions. Instructors begin by presenting a point of focus. In science, it would be a natural phenomenon; in English, it may be a poem. The students, working in groups, are then directed to develop questions, make predictions, and hypothesize. They are to collaborate to determine the validity and accuracy of their constructs. The instructor circulates between the groups to provide guidance, support, or the occasional just-in-time information. As the students grow more confident with their role in the process, they further investigate, make observations, or conduct research to discover evidence that can be used to solve problems or draw conclusions. Students learn from each other as they collaborate and share their solutions or conclusions with the class. This may also result in some debate or further questioning which leads to additional study or experimentation. Inquiry-based learning is an active learning strategy that promotes critical thinking and fosters independent learning.

Motivation to implement Inquiry-Based Learning in class:

Dr. McKinnon has been a proponent of inquiry-based learning for many years. He has a wealth of experience with students and has observed that no matter how many times a concept is covered in lecture, students do not gain a deep conceptual understanding until they are guided through discovery themselves. Inquiry-based learning is a pedagogical approach that has been shown to facilitate conceptual development and increase student learning, especially in the experimental sciences. It also leads the student to become more adept at weighing the validity of their own as well as others' conceptual constructs, an important component of critical thinking.

Strategies to maximize class time:

Through guided exploration and problem-solving students construct and apply knowledge across different contexts and develop their critical thinking skills. To maximize class time opportunities, it is very important to design a structure that supports student learning. Dr. McKinnon uses his Blackboard course to deliver important content that students will need to prepare for class as well as video wrap-ups for review. Students are aware that class time will be spent on group inquiry, and they have access to the activity sheets before class. Dr. McKinnon refers to the activities as FNTs which stands for "For Next Time." These are not homework review activities; rather, they are pre-work for the next class.

Inquiry-Based Learning Classroom Observation:

Dr. McKinnon opened his College Physics course for this observation.

Dr. McKinnon asked students to take out their FNT's, which contained several problem-based scenarios that each group would solve together on their respective whiteboards around the room. No time was needed to group students on this day because students had been assigned to table groups previously. Groups would be reassigned periodically throughout the semester. (One group included a remote student, and the group members effectively used the camera and computer in the front of the room to work together on a nearby whiteboard.)

Inquiry-Based Learning Classroom Observation (Continued)

As students attempted to construct an understanding of the phenomenon, there was a lot of discussion occurring within the groups. Sometimes there were disagreements among students, and individuals would explain their reasoning to the group while the group members asked questions and decided which approach to implement in their solution. Knowing they would be presenting their work to the class motivated them to find a solution that could be justified.

After each group had some work to show on their board, Dr. McKinnon began to circulate around the room rarely answering questions when asked, instead offering guiding questions to move the group discussions forward. The students were actively involved in peer instruction within their groups. A couple of short but notable quotes during the observation included one student assuring another "I'll explain it" and another exclaiming, "This is so much easier in a group."

As the groups were close to finishing, students began to look around the room at the work of other groups and discuss differences in their work to assess themselves. For this activity, Dr. McKinnon had asked half of the groups to work on problem two and half to work on problem three. When it was time to present, half the class presented and explained the problem and solution to the other half of the class. Dr. McKinnon provided feedback for each group and finished with a wrap-up. He also includes a brief video wrap-up for students to review in the Blackboard course.

A second activity that day had each table group engaging in a hands-on experiment rolling balls down tracks of different inclines. Students were asked to make predictions about how the ball would behave on each track, followed by careful observations of the actual phenomenon resulting in students drawing evidence-based conclusions about the physics concepts they were learning.

CLICK TO VIEW

SAMPLE ACTIVITIES