Newtown High School Teacher Is Starting His Doctoral Study

By Laurie Borst

"The formulation of a problem is often more essential than its solution, which may be merely a matter of mathematical or experimental skill."

The above statement is from Albert Einstein, perhaps the greatest physicist ever. And that idea of his, that finding the right question is of utmost importance, is the gist of the doctoral work being done by Newtown High School biology teacher Frank LaBanca.

Mr LaBanca has been involved in applied research with his students for seven years. He has accompanied many students to science fairs and observed many students' projects.

His teaching experiences have led him to ask, "How do students who excel at science fairs find good problems?"

"Schools have done a good job of teaching problem-*solving* skills," Mr LaBanca stressed. "Students are creative, which is necessary for solving problems."

He added that in the classroom setting, students are often presented with a problem by the teacher due to time constraints.

When the time is available, there are several steps a student must follow to problem find. The creative piece is still part of the process. The student considers what topic is of interest to him/her. Once a topic is determined, the student must evaluate if he or she has the ability, knowledge, equipment, etc to reach a successful conclusion.

As with any good scientific research, the scientist must review the existing literature. Has the question been studied in the past? Were any productive outcomes reached? Did the experimentation lead to other questions?

While the students work through their research they will encounter snags and obstacles that alter their investigations. Sometimes, they are sent back in the process, needing to investigate further, or change the question completely.

As Mr LaBanca formulated his study, he investigated previous research. Very little study has been done on the subject of problem-finding.

"One psychology text had about 30 pages on problem-*solving*, and just a couple on problem-*finding*," he stated.

Mr LaBanca has performed a pilot study in a structured environment observing students engaged in research activities. He found that students who performed well had had apprenticeship periods where they learned about the instruments, vocabulary, and techniques required for scientific inquiry.

Having explored student problem-solving, Mr LaBanca has turned his attention to "What are the techniques students use to come up with ideas for research projects? What skills, concepts, and knowledge are needed to get to the final project?"

To answer his questions, Mr LaBanca will draw from students presenting at science fairs, specifically, the Connecticut Science Fair (CSF) hosted by Quinnipiac University and the International Science and Engineering Fair (ISEF) held in Albuquerque, N.M., in May.

Mr LaBanca will select students who excel and those ranked average based on the judges scores. This approach will provide an objective sample based on scoring by professionals in science. He will strive to include state, national, and international students in his sample.

Through surveys and questioning, Mr LaBanca hopes to determine if there are techniques that lead to good ideas and, ultimately, great science fair projects.