Teaching Physics Concepts by Using Forensic Real Life Activities

Singha Prasitpong, Institute for Innovative Learning, Mahidol University, Thailand.
Ratchapak Chitaree, Department of Physics, Faculty of Science, Mahidol University, Thailand
singha_p@yahoo.com

Abstract: *The purpose of this study is to construct hands-on activities based on Forensic real life situations to teach Physics concepts. These Forensic Physics activities focus on both analysis and synthesis process for authentic problems. Examples of these activities are teaching a collision concept by using an activity about skid marks from vehicle accident, including the reaction time; teaching an electromagnetic waves concept by using an activity about the UV analysis of fingerprint on bank notes; and teaching a sound concept by using an activity about the voice identification. Moreover, we integrated all previous Forensic Physics ideas into the crime scene investigation activity for challenging students to solve the problems as well as reorganizing their knowledge. In our preliminary study, these Forensic Physic activities were used with 13 senior university students in Physics discipline, after that we evaluated students' attitude relevant to self-confidence, value to society, and desire to do Forensic Physics by using the modification of the Modified Attitudes Toward Science Inventory (mATSI) (Weinburgh and Steele, 2000). Results revealed that more than 80% of these students have high self-confidence (high level of Likert-scale) about performing Forensic Physic activities, are aware in the value of Forensic Physic to society in high level, and desire to do Forensic Physics in high level. Ultimately, an average achievement score of these students is more than 80% (A standard deviation value equals 6.2%).*

The Power of Demographic and High School Experience Factors on Geoscience Success

Suttida Rakkapao, Institute for Innovative Learning, Mahidol University, Thailand
Julie Libarkin, Department of Geological Sciences and Center for Research on College Science Teaching and Learning, Michigan State University, USA
tha_416@hotmail.com

Abstract: *A growing body of literature documents that demographic and high school experience factors correlate with academic achievement in higher education. The most significant variables influencing entry-level college science success include gender, age, high school GPA, high school class, and socio-economic status variables (Hedges and Nowell, 1995; Caldas and Bankston, 1997; Sadler and Tai, 2007). Although this previous work suggests that non-cognitive variables can be used to predict success in some sciences, the geological sciences were overlooked in this prior work. This study aims to examine the relationship between demographic and high school experience factors and student understanding of geosciences, exposed by the Geoscience Concept Inventory (GCI; Libarkin and Anderson 2005). More than 2500 entry-level students from 38 colleges and universities located in 22 states of the United States completed a 19-item version of the GCI, coupled with a background form requesting gender, high school GPA, birth date, major, race, high school science experience, and highest degree of male and female parents. The results of the Pearson product-moment correlation revealed a small to medium size effect between the GCI scores and gender, high school GPA, race, female and male guardian education level, enrollment in high school physics, and institutional type. The multiple stepwise linear regression analysis indicated that gender, high school GPA, race, enrollment in high school physics, and institutional type appeared to be the best predictors for student success on the GCI. Overall, these predictors account for less than 20% of the fluctuation in GCI pre- or post-test scores, indicating that the GCI is a good measure of geoscience understanding across populations.*