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"Skateboards, roundabouts & blood" - an investigative case study of human ABO blood types: Does a CSI context improve learning and engagement?

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The purpose of this study was to evaluate the effectiveness of the CSI case-based approach of laboratory instruction by engaging the students as forensic investigators in a particular lab topic for both majors (Bio 2130) and non-majors (Bio 1050) classes. The specific goal was to determine whether integrating a forensic approach with laboratory investigation of a scenario improves student enthusiasm/interest with potentially increased learning of the core concepts of forward and reverse blood typing. The original lab was divided into two parts in the Winter of 2020 (precovid) to provide students with the opportunity to develop their skills in blood analysis in Part 1. In part 2, students apply higher-order skills to give priority to evidence as they collaborate to solve the crime scene. Using a web-based Likert survey, most students (95%; n=42) agreed that the story about a hit-and-run accident helped them to see the real-life value of understanding human ABO blood groups, and 91% reported that the lab was more enjoyable in this context. Many students felt that the case-based scenario helped them to better understand antigen-antibody interactions (78.6%; n=42), while most reported an increase in their general knowledge of the ABO blood groups (92.9%; n=42) and that they were encouraged to think critically about forward and reverse blood typing concepts (90.5%). In support, ALL respondents rated 'Learning subjects that have a clear meaning with life connections 'having a serious, important, or useful quality or purpose (this is real world)' and 'Learning the subject matter' as very important/important. Preliminary evaluation of open-ended comments of what students liked about the SRB lab suggests that the crime scene investigation aspect was helpful. With a few modifications, additional data will be gathered from current Winter 2022 classes (majors and non-majors) and presented at ABLE 2022.

Keywords: Blood typing, CSI, case study

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